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Project No. 305915
February 1994

Final Plan

Site Health and Safety Plan Combined Hazardous Waste Battery and Drum Removal Action Sites 4, 16, and 21

Naval Weapons Station Yorktown, Virginia

Contract No. N47408-92-D-3045
Delivery Order No. 0005

Prepared for:
Naval Construction Battalion Center
Naval Facilities Engineering Command
NAVFAC Contracts Office, Code 27233, Building 90
Port Hueneme, California 93043-5000



Prepared by:
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SITE SAFETY & HEALTH PLAN

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List of Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
CBC	Complete blood count
CGI	combustible gas indicator
COTR	Contracting Officer Technical Representative
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
dBA	A-weighted sound pressure level
DOT	Department of Transportation
EED	electronic explosive devices
EMR	Environmental Medicine Resources
EPA	U. S. Environmental Protection Agency
ERP	Emergency Response Plan
EZ	exclusion zones
FA	first aid
FM	Factory Mutual
GFCI	ground fault circuit interrupters
HEPA	high efficiency particulate air
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheets
MSHA	Mine Safety and Health Agency
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NWS	Naval Weapons Station
NTR	Navy Technical Representative
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	personnel protective equipment
PZ	piezoelectric
RCRA	Resource Conservation and Recovery Act
SCBA	Self-Contained Breathing Apparatus
SSHC	Site Health and Safety Coordinator
SSHP	Site Safety and Health Plan
SMAC	Sequential Multiple Analyzer Computer
STEL	short-term exposure limit
SZ	support zone
TLV	Threshold Limit Values
TWA	time-weighted average
USACOE	United States Army Corps of Engineers
USDOL	United States Department of Labor
UL	Underwriters Laboratories
USN	United States Navy
UXO	unexploded ordnance
VOC	Volatile Organic Compound
WBGT	Wet Bulb Globe Temperature

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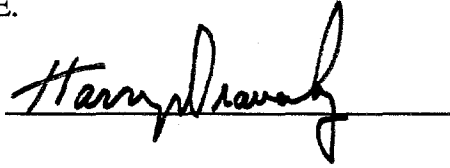
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Review and Approvals

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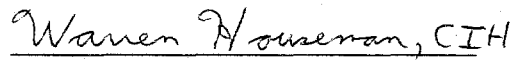
2-28-94

Date

Warren Houseman, C.I.H.

H&S Manager

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2-28-94

Date

Date _____

1.0 Introduction

1.1 Objective

This SSHP establishes the work practices necessary to help ensure the protection of IT personnel and subcontractors during the removal action for Sites 4, 16, and 21 at the NWS Yorktown near Yorktown, Virginia.

The objective of this plan is to provide a mechanism for the establishment of safe working conditions at the site. The safety organization and procedures have been established following an analysis of potential hazards at the site. Specific hazard control methodologies have been evaluated and selected in an effort to minimize the potential of occupational illnesses, accidents and injuries.

All site operations will be performed in accordance with applicable state, local and IT corporate regulations and procedures, OSHA requirements, and all USN requirements. All IT employees and subcontractors must comply with the requirements set forth in this plan.

1.2 Site/Facility Description

NWS Yorktown is a 10,500-acre facility located between the York and James Rivers in York County, Virginia. It is bordered to the north by Cheatham Annex Naval Supply Center, by the York River on the east, and by Interstate Highway 64 on the west (Appendix A-1).

Some of NWS Yorktown's past missions included the development and testing of high explosives and advanced weapon systems. Currently, it provides advanced weapons maintenance, production, and storage in support of U.S. Navy activities.

A portion of the waste materials generated from these activities were apparently randomly disposed of at NWS Yorktown creating numerous waste sites across the facility. Delivery Order No. 0005 deals with the removal of wastes from Sites 4, 16, and 21 located southwest of West Road.

Site 4: Burning Pad Residue Landfill. Site 4 covers approximately 10 acres and was used between 1940 and 1975 as a landfill for the disposal of batteries, burning pad residues (from the ignition of explosives), tree stumps, fly ash from coal-fired boilers, mine casings, and electrical equipment, including transformers. The site is estimated to contain 600 tons of these materials.

Landfilling reportedly was conducted in a ravine using trench and fill methods. Geophysical studies conducted in 1992 (Baker Environmental and Roy F. Weston, Inc., 1992) indicate that the depth of fill in the main fill area, is about 5 to 10 feet.

Site 16: West Road Landfill. Site 16 was reportedly active from the 1950's to the early 1960's for the disposal of unknown 55-gallon drums, various chemicals, dry carbon batteries and pressure transmitting fluid. These wastes were likely used for filling of depressions located within the 8-acre site. Its main surface features include trees, brush, and various grasses.

Site 21: Battery and Drum Disposal Area. Site 21 is a recently discovered area adjacent to Site 4. Batteries and 5- to 55-gallon drums are visible on the surface of the approximately 2-acre site. These waste materials were randomly dumped across the site with no indication of landfilling activities.

The CQC Plan developed for this delivery order contains an additional description of the three sites.

1.3 Policy Statement

It is the policy of IT to provide a safe and healthful work environment for all its employees. IT considers no phase of operations or administration to be of greater importance than the prevention of injury and illness. Occupational health and safety takes precedence over expediency or shortcuts. Every illness, accident, and injury is avoidable, and IT will take every reasonable step to reduce the possibility of their occurrence.

This SSHP prescribes the procedures that must be followed by all site personnel. Operational changes which could affect the health or safety of personnel, the community or the environment will not be made without prior approval of the Project Manager and the H&S Manager.

The provisions of this plan are mandatory to all IT personnel, subcontractors, and visitors. Work conditions can change as operations progress; therefore, the H&S Manager will provide written addenda to this SSHP when changes occur and when additional site-specific information is available. No changes to the plan will be implemented without prior approval of the H&S Manager or his authorized representative.

1.4 References

This SSHP complies with applicable OSHA and EPA regulations. This plan follows the guidelines established in the following documents:

- Navy/Marine Corps Installations and Restoration Manual (February 1992)
- Standard Operating Safety Guides [United States Environmental Protection Agency (EPA) July 1988]
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities [National Institute for Occupational Safety and Health (NIOSH) 85-115]
- Title 29 of the Code of Federal Regulations, Part 1910.120 (29 CFR 1910.120); [United States Department of Labor/Occupational Safety and Health Agency (USDOL/OSHA)]
- Safety and Health Requirements Manual EM 385-1-1 [United States Army Corps of Engineers (USACOE) Revised October 1992]
- Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices [American Conference of Governmental Industrial Hygienists (ACGIH) 1992-1993]

Contents of this plan are consistent with the following IT H&S Policies and Procedures:

IT Health and Safety Policies and Procedures

Procedure Number	Procedure Name
HS001	Safety Policy
HS010	Employee Safety and Health Work Rules
HS011	Contractor Safety and Health Rules
HS013	Health and Safety Procedure Variances
HS019	Injury and Illness Prevention Program (Revision 2)
HS020	Accident Prevention Program: Reporting, Investigation, and Review (Revision 3)
HS021	Accident Prevention Program: Management Safety Audits and Inspections (Revision 3)

Procedure Number	Procedure Name
HS022	Accident Prevention Program: Review of New Proposals, Projects, Operation, and Construction
HS040	Stop Work Authority
HS041	Embryo-Fetus Protection Program
HS050	Training Requirements
HS051	Tailgate Safety Meetings
HS052	Health and Safety Plans
HS060	Hazard Communication Program
HS080	Insurance Claims
HS090	OSHA Regulatory Inspections
HS091	Serious Injury and Fatality Reporting Requirements
HS092	Occupational Injury and Illness Reoccurred
HS100	Medical Policies and Procedures
HS101	Drug and Alcohol Testing (Revision 1)
HS102	Access to Employee Exposure and Medical Records
HS104	Employee Notification of Industrial Hygiene Monitoring Results
HS105	Occupational Injuries/Illnesses Procedures
HS106	First Aid Kits
HS300	Confined Spaces, Industrial
HS304	Compressed Gases
HS306	Handling Known Compressed Gas Cylinders
HS307	Excavation and Trenching
HS310	Hazardous Waste Operations at Uncontrolled Waste Sites
HS314	Hot Work in Hazardous Locations
HS400	Working in Hot Environments
HS401	Cold Stress
HS402	Hearing Conservation Program
HS500	Handling of PCBs

Procedure Number	Procedure Name
HS501	Handling of PCBs in the Laboratory
HS502	PCB Containment and Spill Prevention Requirements for Transport Vehicles
HS503	Handling of Dioxin and Furan Contaminated Materials
HS505	Handling of Inorganic Lead, Inorganic Lead Compounds, and Organic Lead Soaps
HS506	Handling of Inorganic Arsenic
HS508	Handling of Beryllium and Beryllium Contaminated Materials
HS509	Handling, Removal and Disposal of Asbestos and Asbestos Contaminated Materials
HS511	Handling of Benzene and Benzene Contaminated Materials
HS512	Handling of Blood or Other Potentially Infectious Materials
HS513	Handling Radioactive Materials
HS600	Personal Protective Equipment
HS601	Respiratory Protective Program
HS602	Eye Protection - Prescription Safety Glasses
HS603	Maintenance of Survey Equipment
HS604	Use and Maintenance of Portable Electrical Equipment
HS606	Soil Density Gauges
HS800	Motor Vehicle Operation: General Requirements
HS810	Commercial Motor Vehicle Operation and Maintenance
HS820	Forklift Operation
HS821	Breathing Air Cylinder Trailer

These policies and their implementation are central to IT's accident prevention program. The Contract Health and Safety Program Plan developed for the Combined Waste Contract contains copies of these procedures. One copy of this plan will be maintained on site for reference purposes.

2.0 Responsibilities

2.1 All Personnel

All personnel are responsible for continuous adherence to these H&S procedures during the performance of their work. No person may work in a manner that conflicts with the intent or the inherent safety and environmental precautions expressed in this SSHP. After due warnings, any person who violates safety procedures, will be dismissed from the site. IT employees and subcontractors are subject to progressive discipline and may be terminated for continued violations.

2.2 Project Manager

The Project Manager is ultimately responsible for ensuring that all project activities are completed in accordance with the requirements set forth in this plan.

2.3 Site Superintendent

The Site Superintendent supervises all IT activities at the site and is responsible for field implementation of this SSHP. This includes communicating site requirements to all personnel, ensuring field supervisors and subcontractors enforce all provisions of the plan and consulting with the H&S Manager regarding changes to the SSHP. Other responsibilities include:

- Reading and becoming familiar with this SSHP and IT Policies and Procedures
- Enforcing the SSHP and other safety regulations
- Stopping work as required to ensure personal and environmental safety and health
- Discussing potential H&S hazards with the H&S Manager and the Project Manager
- Implementing changes as directed by the H&S Manager and Project Manager.

2.4 Health and Safety Manager

The H&S Manager is responsible for developing and coordinating the site-specific SSHP and addenda as required. Other H&S Manager responsibilities include:

- General H&S program administration.
- Determining the level of personnel protection required.
- Updating equipment or procedures based on information obtained during site operations.

- Establishing air monitoring parameters based on expected contaminants.
- Establishing employee exposure monitoring notification programs.
- Investigating significant accidents and illnesses and implementing corrective action plans.
- Performing regular site inspections.
- Developing site-specific employee/community emergency response plans as required based on expected hazards
- Contact for regulatory agencies on matters of H&S.

2.5 Site Safety and Health Coordinator

The SSHC has the ultimate responsibility to stop any operation that threatens the health or safety of the team or surrounding populace or that causes significant adverse impact to the environment. Other responsibilities include but are not limited to:

- Enforcing all of the safety procedures contained within this SSHP
- Observing work party members for symptoms of exposure or stress
- Upgrading or downgrading, in coordination with the H&S manager and the Project Manager, the levels of personal protection based upon site observations and monitoring results
- Informing the project H&S Manager of significant changes in the site environment that require equipment or procedure changes
- Arranging for the availability of on-site emergency medical care and first aid, as necessary
- Determining evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation
- Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site
- Establishing contamination control zones
- Presenting daily Tailgate Safety Meetings

- Assuring that the respiratory protection program is implemented
- Assuring that decontamination procedures meet established criteria.

2.6 Subcontractors

All IT subcontractors and their personnel are responsible for understanding and complying with all site requirements. Subcontractors are required to follow the guidelines established in IT's General Safety Rules for Contractors and this SSHP.

2.7 Visitors

All visitors are required to comply with the provisions of this SSHP and are responsible for conducting themselves in a safe and healthful manner while on site. Visitors must sign the project log upon arrival and prior to leaving the site. The H&S Coordinator will brief visitors on the contents of this plan and provide a copy if desired.

3.0 Job Hazard Analysis

3.1 Scope of Work

IT will conduct a removal action for Sites 4, 16, and 21 located on NWS Yorktown. The following tasks are expected to be performed at each of the three sites:

- Site survey
- Clearing and grubbing
- Soil sampling
- Access road and lay down area construction
- Excavation of contaminated materials
- Excavation and handling of soil/batteries
- Drum removal and sampling
- Containerize, pump, and sample water
- Equipment decontamination
- Site restoration.

3.2 Job Hazard Assessment by Task

The Hazard Assessment identifies potential safety, health, and environmental hazards and provides for the protection of personnel, the community and the environment. Because of the complexity and constant change of remediation projects, supervisors must continually inspect the work site to identify hazards which may harm site personnel, the community or the environment. The Project Manager, Site Superintendent, and SSHC must be aware of these changing conditions and discuss them with the H&S Manager. The H&S Manager will write addenda to change Job Safety Analyses and associated hazard controls as necessary.

The waste materials dumped at the three sites include batteries, ordnance, scrap metal, fly ash, electrical transformers, and drums that contain unidentified materials (Refer to Section 3.4). All IT personnel, subcontractors, and visitors will be familiar with these hazards, and strictly adhere to the appropriate safety procedures prescribed in this SSHP. The potential hazards and their appropriate control measures will be presented to project personnel during site specific training and Daily Tailgate Safety Meetings conducted by the SSHC.

3.2.1 Task 1: Site Survey

IT will solicit a subcontractor for the topographical survey of the three areas. Each of the waste removal locations will be staked.

Physical Hazards. During this task, subcontractor employees will be exposed to various slip, trip, and fall hazards associated with heavily vegetated sloped areas. Care and attention must be paid to where employees are walking since hidden nails, spikes, and other debris can result in puncture wounds or lacerations.

Heat stress may be of concern during this task and all other tasks associated with this project. Section 3.3 includes a thorough discussion on the signs and symptoms of heat stress.

Biological hazards such as poisonous plants and animals may also be a concern to project personnel. Section 3.7 contains a discussion on biological hazards anticipated to be encountered.

Machetes may be used to clean underbrush during the topographical survey. Personnel must take special precautions when using them since these instruments pose a potential for very serious injury. Section 4.8 contains a discussion on machete safety.

Personnel will take extra precautions during this task due to the variation of slope of the work area. Attention must be paid to footing at all times due to the consequences of slips, trips, or falls when working on grades.

Chemical Hazards. Inhalation of contaminated dust or vapors poses a slight potential hazard for exposure during this task. Skin absorption of contaminants may also pose a slight risk from dermal contact with site contaminants. Sections 3.5 and 3.6 discuss possible chemical hazards and their associated exposure standards. Both inhalation and skin absorption risks during this task will be minimal.

3.2.2 Task 2: Clearing and Grubbing

Clearing and grubbing activities will occur prior to many of the tasks associated with this project. These activities will consist of the removal of small trees, brush, and grasses in and adjacent to the contaminated areas.

Physical Hazards. During this phase of operations employees will be exposed to several hazards including slip, trip, and falls. Care and attention must be paid to where employees are walking, since hidden nails, spikes, and other debris can result in puncture wounds or lacerations.

Vegetation acts as a cover for many of these slip, trip, and fall hazards, so extra caution must be used.

Machetes may be used to clear underbrush as well as mechanical equipment. Personnel must take special precautions when using them since these instruments pose a potential for very serious injury. The Tailgate Safety Meeting will address these hazards and their control procedures when applicable.

Fuel handling is another hazard which will be present during this task. Refueling of the mechanical equipment poses serious burn hazards. All refueling and fuel handling equipment must be UL listed and FM approved. The refueling must be done in a designated area to prevent contamination from minor spills and to reduce the risk of fires.

Tree-felling operations pose a potential for serious injury if personnel are not cautious while felling trees. Section 4.6 discusses some of the necessary precautions personnel must take to prevent being struck by falling trees.

Heat stress is a potential concern and employees are cautioned to heed possible warnings of this condition. Section 3.3 contains a thorough discussion on the signs and symptoms of heat stress.

Chemical Hazards. The potential for exposure to contamination during this phase of the operation will be moderate. Dust emissions from the grubbing operation and handling of contaminated roots are the most probable sources of exposure. Sections 3.4 and 3.5 discusses these possible chemical hazards and their exposure standards.

3.2.3 Task 3: Soil Sampling

IT will collect and analyze soil samples from various locations of the three sites. The samples will be analyzed off site for various general chemical parameters. A total of 99 samples will be obtained from the three sites and will be analyzed for Target Compound List (TCL) parameters.

Physical Hazards. The physical hazards involved in this task are related to the handling of contaminated soil.

Slip, trip, and fall hazards will be of concern during this task. Should the walking or working surfaces become wet extra caution must be taken to avoid slipping.

Noise is not expected to be a hazard during this operation, but if noise levels exceed 85 dBA, the use of hearing protection will be required.

Employees will follow proper lifting techniques when sampling. No one will be permitted to lift over 60 pounds without first getting assistance.

Chemical Hazards. Inhalation of contaminants from contaminated soil may pose a potential hazard for exposure during this task. Skin absorption from contact with contaminated soil also poses a risk. Sections 3.4 and 3.5 discuss possible chemical hazards and their exposure standards. Exposure potential during this task is expected to be minimal.

3.2.4 Task 4: Access Road and Laydown Area Construction

IT will construct temporary roads and laydown areas to provide vehicle access and equipment storage for the three sites. The gravel road design will consist of a geotextile and a minimum of 6 inches of coarse aggregate. The laydown areas will be lined with a 40 mil PVC liner over a sloped subbase with a shallow sump to facilitate the removal of collected stormwater. Periodic maintenance on the roads and laydown areas will occur until the project is complete.

Physical Hazards. During access road and lay down area construction, employees will be exposed to various slip, trip, and fall hazards. Heat stress may be of concern during this task. Sections 3.3 contains a discussion on the signs and symptoms of heat stress.

Other physical hazards faced by employees include: noise, equipment traffic, truck traffic, lifting, and various slip, trip, and fall hazards associated with material placement.

Site personnel in the immediate material dumping area will wear orange safety vests to clearly identify themselves to traffic personnel. Cones, caution tape, barricades or other means must be used to define this area. General safety practices shall be followed according to Section 4.1

Chemical Hazards. Exposure potential for this task will be minimal since the road will be constructed in a clean area with clean material. No intrusive activities are associated with the construction of the access roads and lay down areas.

3.2.5 Task 5: Excavation of Contaminated Materials

Waste materials will be excavated from each of the three sites using conventional earth-moving equipment. If the material can be recycled, the material will be transported to the scrap metal pile located near Site 16. Waste materials will be placed into roll-off bins, when appropriate, to minimize standby time during removal and transportation activities.

Physical Hazards. The physical hazards involved in this task are related to the excavation of materials and the operation of heavy equipment. The possible presence of overhead utilities such as power lines requires careful positioning of equipment in order to maintain at least a 15-foot distance between the lines and the closest part of the equipment. The presence of underground utilities such as gas, power, water, and sewer lines must be determined prior to beginning any excavation activities.

Excavation to depths below four feet is not likely to occur during this task, but in the event such an operation does take place it must be carefully controlled. There exists a chance for the excavation to collapse if it is not dug properly or shored as required. The excavation is also a fall hazard and employees must pay careful attention to what they are doing or they risk falling into the excavation.

The possibility exists that UXO could be discovered at any of the three sites. Section 4.9 discusses some safety concerns associated with UXO and will be strictly adhered to.

It is not likely that project personnel will encounter confined spaces, but if it does occur, the IT procedure for confined space entry will be followed for each such activity. A confined space is defined by IT as a space large enough and so configured that an employee can bodily enter and perform assigned work, has limited means for entry and exit, and is not designed for continuous employee occupancy. Contaminated soil excavations may pose additional hazards such as air contamination, flammable or explosive atmosphere, and oxygen deficiency. Section 4.2 discusses confined space entries in greater detail.

Noise may also present a hazard. Heavy equipment operation frequently results in noise levels exceeding 85 dBA, requiring the use of hearing protection.

All operators of equipment used on site will be familiar with the requirements for inspection and operation of the equipment. Unfamiliar operations will be discussed with affected employees before beginning work. The Site Superintendent will be responsible for checking the proficiency of the operators.

Employees will follow proper lifting techniques and no one will be permitted to lift over 60 pounds without first obtaining assistance.

Fuel handling is another hazard present during this task. Refueling of the mechanical equipment poses serious burn hazards to employees.

Chemical Hazards. Inhalation and ingestion of contaminated materials from this task poses a significant potential hazard for employee exposure. Skin absorption also poses a risk from physical contact with the materials. Real time air monitoring will be performed during this task for total fugitive dust emissions and volatile organic compounds to ensure that action levels are not exceeded. Sections 3.5 and 3.6 discuss the possible chemical hazards and their exposure standards.

3.2.6 Task 6: Excavation and Handling of Soil/Batteries

Soil and batteries will be excavated from Sites 4, 16, and 21 using conventional earth-moving equipment. The battery fill is approximately two to four feet thick with six to eight inches of topsoil cover. Soil and battery mixture will be inspected, and the larger batteries will be removed manually. The soil and batteries will then be processed using a 2-inch grizzly followed by a 3/8-inch screen. Once batteries are separated from the soil, they will be stockpiled on a lined area, then sampled to determine disposal options.

Physical Hazards. Physical hazards associated with this task are excavation of materials, heavy equipment operations, and manual lifting. The location of overhead and underground utilities such as powerlines, gas, water, and sewer lines must be determined prior to commencement of excavation activities to ensure safe clearances are maintained.

Personnel will maintain a safe distance when batteries are being loaded onto grizzly and screen.

Noise exposure may also present a hazard. Heavy equipment and screen activities frequently result in noise levels exceeding 85 dBA, requiring the use of hearing protection and engineering controls to reduce sound levels.

Equipment operations must be coordinated with ground personnel working in the excavation areas. Excavation to depths below four feet is not likely to occur during this task, but in the event such an operation does take place, it must be carefully controlled.

Proper manual lifting techniques will be followed during battery extraction and sorting operations. Manual lifts greater than sixty pounds require assistance or the use of mechanical equipment.

The possibility exists that UXO could be discovered at any of the three sites. Section 4.9 discusses some safety concerns associated with UXO and will be strictly adhered to.

Slip, trip, and fall hazards will be prevalent inside and around the excavation areas. Slip, trip, and fall hazards will be identified and remedied during work activities.

Lockout/tagout procedures (Appendix G) will be utilized for maintenance operations for equipment.

Chemical Hazards. Inhalation of contaminants from contaminated soil may pose a potential hazard for exposure during this task. Skin absorption from contact with contaminated soil also poses a risk. Sections 3.4 and 3.5 discusses possible chemical hazards and their exposure standards. Exposure potential during this task is expected to be minimal.

3.2.7 Task 7: Drum Removal and Sampling

There are an unknown number of drums to be located, excavated, removed, and sampled from the three sites. These drums will be handled with extreme caution until their contents are positively identified.

Physical Hazards. There are many physical hazards associated with the sampling and movement of drums that contain unknown materials. Some of these hazards include explosions, spills, fires, splashes, and physical injury hazards due to the size and varying weights of drums. The procedures in Section 4.7 will be followed to reduce the possibility of employee injury while performing this task.

Chemical Hazards. Inhalation and ingestion of unknown materials present in the drums poses a potential hazard for employee exposure. Skin absorption of unknown material also poses a risk from contact with the contents of the drums. Real-time air monitoring will be performed during this task for VOCs, combustible gases, and ionizing radiation to ensure that action levels are not exceeded. Sections 3.5 and 3.6 discuss the possible chemical hazards and their exposure standards.

3.2.8 Task 8: Containerize, Pump, and Sample Water

Water will be pumped from excavated areas to a temporary holding tank. This water will be sampled on site with its final disposition dependent upon analytical results.

Physical Hazards. The physical hazards involved in this task are related to the handling of water.

Slip, trip, and fall hazards will be of concern during this task. Should the walking or working surfaces become wet, extra caution must be taken to avoid slipping.

Noise is not expected to be a hazard, but if noise levels exceed 85 dBA the use of hearing protection will be required.

GFCIs will be in place on all electrical equipment and extension cords used during this activity. GFCIs will be tested periodically to ensure that adequate protection is being given to employees exposed to electrical shock hazards. All electrical equipment and extension cords used during this project must be inspected periodically and also must be UL listed.

Splash hazards will also be present during water pumping and sampling. Employees will be made aware of this hazard and handle all water with appropriate care. Only explosion proof pumps will be used to transfer water. All equipment and tubing will be inspected and tested for

potential leaks before being put into use. Splash shields will be used by all employees engaged in this activity.

Employees will follow proper lifting techniques when water sampling and setting up pumping devices. No one will be permitted to lift over 60 pounds without first getting assistance.

The potential exists for cuts and scrapes when working with sharp objects and glass jars. Employees will inspect all glassware for cracks and abnormalities prior to use and handle them with extreme care.

Chemical Hazards. Inhalation and ingestion of contaminated water may pose a potential hazard for exposure during this task. Skin absorption of contaminants from contact with the water also poses a risk. Sections 3.5 and 3.6 discuss possible chemical hazards and their exposure standards. Exposure potential during this task will be minimal.

3.2.9 Task 9: Equipment Decontamination

All equipment and materials used in contaminated areas will be decontaminated with a laboratory detergent and water using a brush to dislodge particulate matter and verified as clean prior to leaving the site.

Physical Hazards. Several hazards are associated with this phase of the operation including slip, trip, and fall hazards, and the operation of heavy equipment and high-pressure water washers.

All operators of equipment used on site will be familiar with the requirements for inspection and operation of the equipment. Unfamiliar operations will be discussed with appropriate employees before beginning work. The Site Superintendent will be responsible for checking the proficiency of the operators.

Employees will follow proper lifting techniques and no one will be permitted to lift over 60 pounds without first obtaining assistance.

Noise will present a hazard during this task. Pressure washing operations frequently result in noise levels exceeding 85 dBA, requiring the use of hearing protection.

Fuel handling is another hazard present during this task. Refueling of the mechanical equipment poses serious burn hazards to employees.

Heat stress is a potential hazard and employees are cautioned to be aware of the warning signs of this condition.

Chemical Hazards. The potential exists for exposure to contamination during this task. Dust generation and direct contact with surface contamination and detergent are the most likely routes of exposure. Sections 3.4 and 3.5 contain a discussion on the hazardous and toxic substances likely to be encountered.

3.2.10 Task 10: Site Restoration

After all other site activities are complete, the sites will be regraded and revegetated.

Physical Hazards. Noise, equipment, traffic, lifting, heat stress, and slip, trip, and falls are some of the physical hazards faced by employees during site restoration. A variety of operations will occur and personnel need to stop and examine each task carefully for potential physical hazards. Many of the hazards previously mentioned in other tasks will also be present during site restoration.

Chemical Hazards. Chemical hazards during this activity will be limited to the products or materials used with heavy equipment and ancillary tools. Inhalation and skin absorption risks during this task are minimal.

3.3 Heat Stress and Signs and Symptoms

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and individual characteristics. Extreme hot weather can cause physical discomfort, loss of efficiency, or personal injury.

Individuals vary in their susceptibility to heat stress. Factors that may predispose individuals to heat stress include:

- Lack of physical fitness
- Insufficient acclimation
- Age

- Dehydration
- Obesity
- Alcohol and/or drug use
- Medical conditions
- Infection
- Sunburn
- Diarrhea
- Chronic disease.

Reduced work tolerance and the increased risk of heat stress are directly influenced by the amount and type of PPE worn. PPE adds weight and bulk and severely reduces the body's access to normal heat exchange mechanisms (evaporation, convection, and radiation), and increases energy expenditure.

3.3.1 Signs and Symptoms of Heat Stress

If the body's physiological processes fails to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild to fatal.

Heat related problems include:

- Heat rash - caused by continuous exposure to heat and humidity and aggravated by chafing clothes. Heat rash decreases the body's ability to tolerate heat as well as being a nuisance.
- Heat cramps - caused by profuse perspiration with inadequate electrolytic fluid replacement. Heat cramps cause painful muscle spasms and pain in the extremities and abdomen.
- Heat exhaustion - caused by increased stress on various organs to meet increased demand to cool the body. Heat exhaustion causes shallow breathing; pale, cool, moist skin; profuse sweating; and dizziness. Heat exhaustion can be alleviated by promptly moving the affected individual to a cool place to lie down and providing cool fluids to drink.
- Heat stroke - the most severe form of heat stress. Heat stroke symptoms include hot, dry skin; no perspiration; nausea; dizziness; confusion; strong, rapid pulse; and coma. The body must be cooled immediately to prevent severe injury or death.

3.3.2 Heat Stress Prevention

One or more of the following practices will help reduce the probability of succumbing to heat stress:

- Acclimate workers to heat conditions when field operations are conducted during hot weather.
- Provide plenty of liquids to replace the body fluids lost by perspiration. Fluid intake must be forced because, under conditions of heat stress, the normal thirst mechanism is not adequate to bring about a voluntary replacement of lost fluids.
- Provide cooling devices to aid natural body ventilation. However, these devices add weight and should be balanced against worker comfort.
- If possible, install mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- If possible, conduct field operations in the early morning.
- Train personnel to recognize the signs and symptoms of heat stress and its treatment.
- Rotate personnel to various job duties, if possible.
- Provide shade or shelter to relieve personnel of exposure to the sun during rest periods.

Individuals succumbing to the symptoms of heat stress will notify the SSHC immediately. The onset of heat stress will preempt any of the aforementioned, halt activities and initiate treatment. Early detection and treatment of heat stress will prevent further serious illness or injury and lost work time. Proper and effective heat stress treatment can prevent the onset of more serious heat stroke or exhaustion conditions. Individuals that have succumbed to any heat related illness become more sensitive and predisposed to additional heat stress situations.

3.3.3 Acclimatization The degree to which an employee's body has physiologically adjusted or acclimatized to working under hot conditions is extremely important. NIOSH recommends a progressive six-day acclimatization period for unacclimatized workers before allowing them to work at their full capacity. Under this regimen, the first day of work on site is begun using only 50 percent of the anticipated workload and exposure time, and 10 percent is added each day

through day six. Six days should be considered the average time needed for worker acclimatization due to each individual's physical condition and their ability to adjust to hot and humid environments. It is important to note that employees can lose acclimatization in a matter of days and should be subjected to a short re-acclimatization period when returning to work from long absences.

3.3.4 Wet Bulb-Globe Temperature Monitoring. The WBGT Index technique will be used to measure heat stress potential for site employees. This method will require the use of a heat stress monitoring device such as the Wibget Heat Stress Monitor (Reuter-Stokes). WBGT measurements will be taken a minimum of four times per day when ambient air temperatures exceed 78°F and impermeable clothing is being worn. If impermeable garments are not worn, heat stress monitoring should begin at 85°F. When ambient temperatures exceed 90°F and impermeable garments are worn, physiological monitoring will be implemented. WBGT readings will be compared to the TLVs outlined in the ACGIH TLVs manual and a work/rest regimen established, as necessary, according to the WBGT obtained. Once the initial work/rest regimen has been established, physiological monitoring will be conducted by the SSHC in order to make any necessary adjustments to the regimen. WBGT measurement methods and the establishment of work/rest regimens will be based on the information supplied in Appendix D. Recommended Heat Stress Guidelines for Unacclimated/Acclimated Workers in Hot Environments.

3.3.5 Physiological Monitoring

The two physiological parameters that each individual will monitor are:

- Heart rate - Each individual will count his/her radial (wrist) pulse for 30 seconds as early as possible in the first rest period. If the heart rate of any individual exceeds 100 beats per minute at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same.
- Oral temperature - Each individual will measure his/her oral temperature with a single-use clinical thermometer for one minute as early as possible in the first rest period. If the oral temperature exceeds 99.6°F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same.

An individual is not permitted to return to work if his/her oral temperature exceeds 100.6°F.

Physiological monitoring information will be recorded on the Employee Record for Heat Stress. All monitoring will be performed by persons with a minimum of current Red Cross first-aid certification and individualized training to recognize the symptoms of heat stress.

3.3.6 Training

Personnel (including subcontractor employees) potentially exposed to heat stress conditions will have the following training during the site-specific training.

- Employees
 - Sources of heat stress, influence of protective clothing, and importance of acclimation.
 - How the body handles heat.
 - Heat-related illnesses.
 - Preventive/corrective measures.
 - First-aid procedures.
- IT Supervisors
 - Physiological monitoring, Wet Bulb Globe Temperature (WBGT) measurement methods and establishment of work-rest regimes based upon information supplied in Appendix D. Recommended Heat Stress Guidelines for Unacclimated/Acclimated Workers in Hot Environments.

3.4 Hazardous and Toxic Materials

This section discusses the hazards associated with materials that are used on the site or are likely to be found on the site. The H&S Manager will update this section as information developed during this project warrants. The potential chemical hazards associated with the three sites include many different compounds, the most significant of which are: lead, chromium, coal tar pitch volatiles, chlorodiphenyls, HMX, TNT and RDX. There also exists the chance of encountering many various unknown compounds along with the unidentified contents of buried drums. PPE levels will be adjusted accordingly to account for these known and unknown compounds.

Potential health effects of identified compounds including their routes of entry, symptoms of exposure, and relative toxicity can be found in Table 3-1.

3.5 Exposure Standards

TLV refer to airborne concentrations of substances which represent conditions that nearly all employees may be repeatedly exposed to day after day without adverse effect. These TLVs are prescribed by the ACGIH and are based upon the best available information obtained through industrial experience and animal or human studies. Because of the wide variation in individual susceptibility, a small percentage of workers may experience discomfort from some substances at concentrations below the recommended values. It has been policy to use these guidelines for good hygienic practices; however, whenever applicable, stricter guidelines may be utilized.

Currently, exposure guidelines to pesticides and other chemical substances are regulated by OSHA. These exposures are based upon the TWA concentration for a normal 8-hour workday and a 40-hour work week. Several chemical substances have short-term exposure limits or ceiling values which allow a maximum concentration to which workers can be exposed continuously for a short period of time without suffering from (1) irritation, (2) chronic or irreversible tissue damage, (3) narcosis of a sufficient degree to result in accidental injury, impaired self-rescue abilities or substantially reduced work efficiency.

The STEL is defined by the ACGIH as a 15-minute TWA exposure which should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA. Exposure above the TLV-TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per day. There should be at least 60 minutes between successive exposures in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed biological effects. OSHA requires that a 15-minute "Ceiling" concentration never be exceeded for that chemical constituent. This notation appears as the letter "C" after the chemical name.

Under certain chemical substance listings, a "skin" notation may appear. This refers to the potential contribution to the overall exposure by the cutaneous route, including mucous membranes and eye, either airborne or by direct contact. Little quantitative data is available describing absorption as a function of the concentration to which the skin is exposed. Biological

monitoring may be considered to determine the relative contribution of dermal exposure to the total dose.

The ACGIH and OSHA have recognized through epidemiological studies, toxicology studies and, to a lesser extent, case histories that certain chemical substances may have the potential to be carcinogenic in humans. Because of the long latency period for many carcinogens, it is often impossible to base timely risk management decisions on the results of such information. Two categories of carcinogens are designated based upon the most current literature and information. These include confirmed human carcinogens and suspected human carcinogens. These chemical categories are based on either:

- (1) Limited epidemiologic evidence.
- (2) Demonstration of carcinogens in one or more animal species by appropriate methods.

The worker potentially exposed to a known human carcinogen must be properly equipped to ensure virtually no contact with the chemical constituents. In the case of a suspected human carcinogen, worker exposure by all routes must be carefully controlled by the use of personal and respiratory protection and through administrative or engineering controls.

Table 3-2 represents the strictest set of guidelines currently established by either the ACGIH or OSHA for known site contaminants.

3.6 Biological Hazards

Ticks. Various species of ticks are indigenous to the coastal plains area of Virginia. Ticks are vectors of many different diseases including; rocky mountain spotted fever, Q fever, tularemia, Colorado tick fever, and lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites. Periodically during the work day employees will inspect themselves for the presence of ticks.

Poisonous Plants. Poison ivy, poison oak, and poison sumac are identified by three or five leaves radiating from a stem. Poison ivy is in the form of a vine while oak and sumac are bush-like. All produce a delayed allergic hypersensitivity. The plant tissues have an oleoresin, which

is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur 24 to 48 hours after exposure resulting in burning or stinging, and weeping and/or crusted blisters. Should exposure to any of these plants occur, wash the affected area with a mild soap and water, but do not scrub the area. The best antidote for poisonous plants is recognition and avoidance.

Snakes. Poisonous snakes indigenous to the Virginia tidewater area include Cottonmouth, Copperhead, and Can Break Rattlesnakes. The degree of toxicity resulting from snakebites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches.

The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt.

Flying Insects. Flying insects such as mosquitos, wasps, hornets and bees may be encountered while site activities occur. Table 3-3 discusses problems associated with them.

4.0 Hazard Control Program

The following procedures are mandatory for all IT and subcontractor personnel entering the exclusion zone. All site visitors entering EZ must also follow these procedures. Personnel not following the requirements of this SSHP will be warned. Continued refusal to follow these procedures will result in an escort from NWS Yorktown.

4.1 General Practices

Only authorized personnel will be permitted in the work area. These authorized individuals must meet the training requirements specified in Section 9.0. All visitors will check in with the Site Superintendent upon arriving at the site.

No food, beverages or tobacco products will be present, consumed or used in contaminated areas or potentially contaminated areas. Taking medication, smoking or applying cosmetics are also prohibited. These activities are allowed only in the established clean room and clean areas.

At the end of each work shift, before leaving the site, personnel who worked in contaminated zones and came in contact with contaminated materials will wash themselves.

Before eating, drinking, or smoking employees will wash their hands and face and remove outer protective garments.

Containers will be moved only with the proper equipment and will be secured to prevent dropping or loss of control during transport.

Personnel will be prohibited from being transported by any means other than those prescribed for movement of personnel. When trucks or other heavy equipment enter or leave the site, an individual will direct the driver.

Only intrinsically safe electrical equipment will be permitted in areas where a flammable atmosphere may exist. All static ignition sources will be identified and eliminated by the use of bonding and grounding techniques.

All containers of any chemical products will be properly labeled to comply with OSHA Hazard Communication Standard (29 CFR 1910.1200).

Work areas will be illuminated to a minimum of 20-foot candles. Supplementary lighting may be necessary at night, or in poorly lit areas.

When working around heavy equipment or materials, employees and visitors will adhere to the following precautions:

- Hard hats must be worn at all times on the site.
- Pay attention at all times.
- Maintain visual contact at all times.
- Establish hand signal communication when verbal communication is difficult. Determine one person per work group to give hand signals to equipment operators.
- Be aware of footing at all times.
- All heavy equipment will have backup alarms of some type.
- Use chain hoists, straps and any other equipment to safely aid in moving heavy materials.
- Use proper personal lifting techniques. Use your legs, not your back.
- Get help whenever you are in doubt about a material's weight.
- Never walk directly in back or to the side of heavy equipment without the operator's knowledge.
- Never walk underneath any suspended load and always look overhead when a crane is in use.
- Only qualified people are to operate heavy equipment.

4.2 Buddy System

All on-site personnel will use the buddy system. Buddies will maintain visual contact with each other. Personnel must observe each other for signs of heat stress or toxic exposure, such as:

- Changes in complexion and skin discoloration
- Changes in coordination or demeanor
- Excessive salivation and pupillary response
- Changes in speech pattern.

Personnel will inform their supervisor of nonvisual effects of toxic exposure such as:

- Headaches, dizziness, blurred vision
- Nausea
- Cramps
- Irritation of eyes, skin or respiratory tract.

4.3 Fall Protection

The walking and working surfaces may become wet and slippery during these tasks. Use extra caution when working on these surfaces. In addition, visible barriers will be erected around any open excavations or trenches to prevent personnel from falling into these areas.

4.4 Confined Space Entry

IT's procedure for confined space entry will be followed if such an activity is needed during the completion of this project. A confined space is defined as a space large enough and so configured that an employee can bodily enter and perform assigned work, has limited means for entry or exit, and is not designed for continuous employee occupancy. Contaminated soil excavations, storage vessel entries, and other confined space work may pose additional hazards such as air contamination, flammable or explosive atmosphere, and oxygen deficiency. Excavation entry may pose the possibility of engulfment. IT has detailed training for confined space entry, and only personnel properly trained shall supervise and participate in confined space entry procedures or serve as standby attendants.

All confined spaces are initially considered permit required. Under certain conditions, a space may be reclassified as a non-permit confined space provided the SSHC approves the reclassification and the space meets the criteria outlined in HS300 (See Appendix C - Confined Space Entry Procedure).

4.5 Excavation Safety

All excavating and soil removal conducted by IT and subcontractors will comply with IT Procedures and OSHA regulations governing excavation and trenching.

All excavations will be performed from a stable ground position, and daily inspections of the excavation will be made by a competent person who has received training in excavation safety. The inspector will determine the likelihood of a cave-in, and remedial action such as sloping or shoring will be taken if the walls appear to be unstable.

All spoil will be located at least 2 feet from the edge of the excavation to prevent it from falling back into the excavation. The excavation will be guarded on all sides by barricades or caution tape at least 2 feet from the edge.

All project personnel will participate in the daily Tailgate Safety Meetings and be instructed on the following requirements:

- Before excavating, the existence and location of underground pipe, electrical equipment, and gas lines will be determined. This will be done, if possible, by contacting the appropriate utility company and/or client representative to mark the location of the lines. If the client's knowledge of the area is incomplete, an appropriate device, such as a cable avoiding tool, will be used to locate the service line.
- No ignition sources are permitted if the ambient airborne concentration of flammable vapors exceeds 10 percent (10%) of the Lower Explosive Limit (LEL) during the excavation. A combustible gas indicator will be used to make this determination.
- Operations must be suspended and the area vented if the airborne flammable concentrations reaches 10 percent (10%) of the LEL in the area of ignition source (i.e., internal combustion engine, exhaust pipe).
- A combustible gas reading of the general work area will be made regularly.
- If excavation is located in the vicinity of overhead power lines, a distance of 15 feet must be maintained between the lines and any point on the equipment. If the lines have appreciable sag, or if windy conditions exist, this distance will be 20 feet.
- Personnel entry into any excavation 4 feet deep or greater is only permitted if the walls are properly shored or sloped. A ladder shall be provided and placed at an angle not more than 30 degrees from vertical, and secured as necessary. Ladder side rails shall extend at least 3 feet above the ground surface.
- Caution tape, barricades, or other means must be used to define and restrict access to the area of excavation.

4.6 Clearing - General Practices

If personnel are clearing brush using machetes, the following rules apply:

- When employees are using a machete to clear the area, no one is permitted within 30 feet of the person swinging the machete.
- Personnel will be instructed to not stand with their backs toward the active work area.
- All personnel must wear the appropriate PPE outlined in Section 5.0 and be familiar with the use of a machete.

When trees are being felled, the following rules must be adhered to:

- Before beginning the operation, alert all personnel in the area that the operation is about to commence. Then check that the area around the landing point of the tree is clear.
- Use a spotter to make sure the area remains clear.
- Check that there are no overhead power lines or obstructions that may catch or deflect the tree as it falls.
- Never turn your back on the tree while it is being felled.
- Watch for kickback from the saw and do not force the saw if it becomes stuck in the tree.

Never refuel hot equipment without using a funnel or a pour spout attached to the refueling can. All refueling handling equipment must be UL listed and FM approved. A fire extinguisher must be located within 20 feet. The refueling must be done in a designated area to prevent contamination from minor spills and to reduce the risk of fires.

4.7 Drum Inspection

Visual inspection of exposed drums during excavation activities will be performed to assess the degree of hazard associated with each drum and to determine the proper handling technique. Personnel performing the drum inspection should look for the following information:

- Markings or labels that could potentially indicate drum contents.
- Determine drum type, size, and drumhead configuration.
- Determine contents either liquid or solid, and estimate the quantity of the material.
- Signs of deterioration such as rust, corrosion, and leaks.
- Signs that the drum is under pressure, such as swelling and bulging.

Personnel should assume that unlabeled drums contain hazardous materials until the contents are positively characterized. Drums are frequently reused, thus a drum's label will not always indicate its contents.

Any drums with markings indicating explosive or highly reactive compounds or with yellow, red, or orange crystals present will not be moved. USN EOD personnel will be notified when such a drum is discovered.

4.7.1 Drum Classification

Upon completion of the inspection, personnel shall classify each drum into one of the following categories:

- Bulging Intact - drum under pressure indicated by swelling and bulging.
- Intact - drums sealed with a lid or bung in fair to poor condition with light to moderate damage.
- Crushed - drums that were crushed prior to burial with no apparent contents.

4.7.1.1 Crushed Drums

Drums that are determined to be crushed with no contents will be removed from the excavation. Under no circumstances should personnel physically handle the drums. If the loader is used for drum transfer, a clearly marked loading area should be delineated with barricades or caution tape. Polyethylene sheeting will be placed under the loader bucket to limit any potential contamination migration.

4.7.1.2 Intact Drums

Excavated drums categorized as intact bulging or intact will be handled as outlined in this section.

- When an intact drum is discovered, the SSHC will monitor the atmosphere immediately surrounding the drum with a PID to assess the presence of VOC, a

CGI to determine if a potential explosive atmosphere is present and a radiation survey meter to detect ionizing radiation.

- If the CGI indicates a lower explosion limit in excess of 10 percent or VOC readings exceed the action level of 30 ppm, the SSHC will halt work activities and direct the trackhoe operator to recover the drum and associated soil and contact the H&S Manager. Additional real-time monitoring action levels for drum handling are outlined in Section 4.7.6 of this plan.
- If the radiation survey indicates greater than background levels of ionizing radiation all activity associated with that drum will cease until contact is made with the H&S Manager. If radiation levels are greater than 1 millirad per hour, USN EOD will also be contacted prior to continuance of work.
- Suitable quantities of absorbent and overpack drums will be kept available and used for drum overpacking and containing leaks or any spills that may occur.
- Drum handling will be performed using a drum grapppler or equipment connected to a trackhoe. Site operations will be organized to minimize the amount of intact drum handling.
- The trackhoe equipped with the drum grapppler or equivalent will place the drum into an overpack. The overpack will be placed in the front-end loader bucket for transfer to the drum staging area awaiting sample collection and Hazcat testing.
- Intact drums will be pierced with a nonsparking spike attached to the trackhoe bucket. Personnel not essential to the operation will not be in the immediate area during drum opening activities. The SSHC will monitor the LEL, VOC, and radiation levels prior to and after the drum has been pierced.
- A unique identification number will be designated for each drum to be sampled. The identification number, sample date, and sample matrix will be recorded on a sample log.
- Hazard characterization will be performed on the intact drum contents. After the characterization is complete, the drum will be handled as appropriate for the identified material. The drum will be clearly marked with its unique identification number and the identified characteristics of the drum contents so that compatibility with other drums can be assessed and the drums can be stored, handled, or disposed of properly. The same markings will also be placed on the drum overpack.

4.7.2 Safety Procedures

This section outlines general safety requirements to be implemented during drum removal, sampling and handling operations. Physical hazards that could potentially be encountered include explosions, fires, spills, splashes, excavations, and heavy lifting. The following procedures will be followed to reduce the possibility of employee injury and to provide protection to the environment during this task.

4.7.2.1 Fire Protection

Two 20 ABC fire extinguishers will be available and ready for use to control small fires. One fire extinguisher will be located in the drum sampling area with the other located at the drum staging area.

Electrical equipment will not be used to puncture or transfer drum contents. All equipment and tools used to open drums will be made of a nonsparking material to prevent sources of ignition. Continuous LEL monitoring will be performed in the excavation area during drum handling operations. Work activities will be halted if LEL concentrations exceed 10 percent and the H&S Manager will be contacted immediately.

4.7.2.2 Drum Excavation/Handling

All drums encountered during excavation will be considered hazardous and handled accordingly until their contents have been positively identified. Only those personnel essential to excavation activities will be in the area.

A maximum depth of six inches shall be removed at each excavation interval to allow ground personnel to identify uncovered drums. Communication between the ground personnel spotting drums and the trackhoe operator is essential for safe execution of this activity. Empty drums will not be crushed on top of unexcavated areas.

All excavation activities will be performed in accordance with IT Policy and Procedure HS307 and all applicable OSHA regulations.

4.7.3 Drum Sampling

Drums will be sampled within the drum staging area. Only those personnel essential to drum opening and sampling operations will be in the drum opening area. Ground personnel will use

heavy equipment to shield themselves as the drums are being pierced. Extreme caution will be taken when opening drums. Drums will be opened with a trackhoe equipped with a nonsparking spike and the operator will be protected by a clear explosion proof shield mounted on the machine.

Prior to and immediately after drum opening activities, the SSHC or his designee will monitor the atmosphere surrounding the drum and once opened, the drum contents with a PID, CGI, and radiation survey meter. Work activities will be halted and the H&S Manager notified if action levels in Section 4.7.6 are exceeded.

A unique identification number must be marked on each drum to be sampled. Identical markings will be placed on the drum's overpack after sampling results are obtained.

Suitable quantities of absorbent and overpacked drums complying with appropriate DOT, OSHA, and U.S. EPA regulations will be kept available and used in areas where leaks, spills, or ruptures may occur.

4.7.4 Drum Storage

After Hazcat and compatibility testing, drums will be segregated in the storage area so that no chemically incompatible drums are stored next to each other. All intact drums will be stored in overpacks.

The drum storage area will be clearly marked with caution tape and barricades. Fire extinguishers will be available for employee use in this area.

4.7.5 General Safety Procedures

- Access and egress areas will be kept clear of debris and other obstructions.
- Slip, trip, and fall hazards will be identified and remedied prior to and during work activities.
- Personnel will not stand on or work from: drums, containers, or equipment buckets.
- Supplied air for Level B respiratory protection shall be certified to be Grade D breathing air or better.

- Workers will not physically handle drums. Objects greater than 60 pounds require assistance or the use of a mechanical lifting device.
- The excavation area will be monitored with a PID, CGI, and radiation survey meter.
- Emergency signal devices shall be placed in all equipment and in the excavation area.
- Fire protection equipment will be inspected and in good working order prior to work activities.
- Slings or chains will not be used to handle intact drums.
- Under no circumstances will intact drums be opened with a bung wrench or other hand tools. Drums will only be opened with a trackhoe equipped with a non-sparking spike.

4.7.6 Action Levels for Drum Handling

The following table outlines the actions to be taken based upon real-time monitoring results obtained during drum removal and handling.

REAL-TIME MONITORING ACTION LEVELS

Monitoring Equipment	Monitoring Results	Action
PID	Less than 30 ppm Breathing Zone	Continue work activities
	Greater than 30 ppm Breathing Zone	Halt work activities, contact H&S Manager
CGI	LEL less than 10 Percent	Continue work activities
	LEL greater than 10 Percent	Halt work activities, contact H&S Manager
	Oxygen Level 20-23 percent	Continue work activities
	Oxygen Level less than 20 percent	Halt work activities, contact H&S Manager
	Oxygen Level greater than 23 percent	Halt work activities, contact H&S Manager
Radiation Survey Meter	Greater than background	Halt work activities, contact H&S Manager
	Greater than 1 millirad/hour	Contact USN EOD

Real-time monitoring results measured in the breathing zone are based on concentrations above background recorded four times in a fifteen-minute period. If monitor results exceed action levels, work activities will be halted to evaluate if engineering controls and levels of personal protection are adequate.

4.8 Unexploded Ordnance

All ordnance at the various sites is anticipated to be inert. As a precautionary measure, an UXO Specialist will be on site full time during excavation activities. This UXO Specialist will be a graduate of the USN School of Explosive Ordnance Disposal and also possess military EOD experience.

If a piece of ordnance is discovered, the UXO specialist will visually inspect it to determine if it is inert or if it presents a hazard to project personnel. If a positive identification cannot be made, the immediate excavation area will be roped off and personnel access restricted. At this point, the USN EOD team will be called in to remediate the suspect piece of ordnance.

If a suspect object is discovered by site personnel, the area will be secured until a UXO expert has declared the object safe.

5.0 Personnel Protective Equipment

The PPE outlined below has been selected according to the site characterization and analysis, job tasks, site hazards, intended use and duration of potential employee exposures. Maintenance and storage of PPE, decontamination, donning and doffing procedures, inspection and monitoring of effectiveness, and limitation are outlined in this section.

5.1 Respiratory Program

A comprehensive respiratory protection program has been established by IT and is required in all locations where use of such equipment is intended to lessen the potential for adverse health affects to any employee.

As part of the respiratory training program, each employee is instructed in the following elements:

- Nature of the respiratory hazard on the work site and the appraisal of potential consequences if the respiratory protection is not utilized
- Use and proper fitting of the respirator
- Cleaning, disinfecting, inspection, maintenance and storage of the respirator
- Proper selection, capabilities and their limitations.

Routinely used respiratory equipment will be inspected, cleaned and disinfected daily to help assure proper hygienic practices. An inspection of these breathing devices will include the following:

- Examination of the head straps for breaks, loss of elasticity, broken or malfunctioning buckles and other attachments
- Examination of the face-piece for excessive dirt, cracks, tears, distortion, holes or inflexibility
- Examination of the exhalation and inhalation valves for any foreign material, cracks, tears or distortion in the valve. Additional checks will be made to inspect for proper insertion, defective valve covers or improper installation

- Examination of air purifying elements for incorrect cartridge, expired shelf-life of the cartridge, cracks or dents in the cartridge or cartridge-holder
- Examination for proper insertion of the cartridges into the face-piece and a check of the gaskets inside the cartridge-holder
- Examination of air cylinders for adequate air volume. Only Grade D air will be utilized for breathing air.

When Level C protection is required, respiratory cartridges will be changed daily or if breakthrough is suspected. All respirators will be inspected prior to each day's use. If broken or malfunctioning parts are found during the cleaning process, these parts will be replaced or new respiratory equipment will be issued to the user.

The respiratory protective equipment will be stored in an area protected from any mechanical damage. These devices will also be stored in a location that provides protection against dust, heat, excessive moisture, or damage by chemical contact. The storage area for the respirators should be in a readily accessible location.

- Only employees who have been trained to wear and maintain respirators properly will be allowed to use respiratory protection.
- Selection of respirators, as well as any decisions regarding upgrading or downgrading of respiratory protection, will be made by the H&S Manager or his designee.
- Qualitative positive and negative pressure tests will be performed each time the respirator is donned.
- Only employees who have been fit tested within the last 12 months will be allowed to work in atmospheres where respirators are required. Subcontractors will provide certificates of respirator fit test completed within the last 12 months for each employee on site.
- Respirator users will be instructed in the proper use and limitations of respirators.
- If an employee has difficulty in breathing during the fit test or during use, he will be evaluated medically as soon as possible to determine if he can wear a respirator safely while performing assigned tasks.

- No employee will be assigned to tasks requiring the use of respirators if, based upon the most recent examination, a physician determines that the health or safety of the employee will be impaired by respirator use.
- Contact lenses will not be worn while using any type of respiratory protection.
- Respirator prescription lens inserts will be utilized by personnel requiring vision correction.
- Air-supplied respirators will be assembled according to manufacturer's specifications. Hose length, couplings, valves, regulators, manifolds and all accessories will meet ANSI and the manufacturer's requirements.
- Respirators will be cleaned and sanitized daily after use.
- Respirators will be stored in a convenient, clean and sanitary location on site.
- Respirators will be inspected during cleaning. Worn or deteriorated parts will be replaced.
- Facial hair that might interfere with a good face-piece seal or proper operation of the respirator is prohibited.
- The SSHC will review the respiratory protection program daily to ensure employees are properly wearing and maintaining their respirators and that the respiratory protection is adequately protecting the employees.
- The H&S Manager and the Project Manager will evaluate the respiratory protection program monthly to ensure the continuing effectiveness.
- Respirators used for emergency response will be inspected weekly by the SSHC.

5.2 Levels of Protection

Specific levels of protection will be changed whenever site conditions change. They can either be increased to the next higher level or decreased to the next lower level. The SSHC can request a change in levels of protection by contacting the H&S Manager. If the need arises to protect employees, the SSHC can upgrade protection levels without input from the H&S Manager. He will then discuss the decision with the H&S Manager, Site Superintendent, and Project Manager when they are available. Levels of protection will not be downgraded without prior approval from the H&S Manager.

The selection of the PPE was made after a thorough evaluation of the hazards involved at the site during each phase of the operation. Table 5-1 describes the PPE required for each task and Table 8-1 describes the action levels for upgrading.

5.3 Using PPE

All persons entering the EZ will don the required PPE according to established procedures in this plan to minimize exposure potential. When leaving the EZ, PPE will be removed according to these established procedures to minimize the spread of contamination.

5.3.1 Donning Procedures

- Remove street clothes and store in a clean location
- Put on coveralls
- Put on boots and boot covers and tape the coveralls
- Put on gloves
- Tape the coveralls over the gloves at the wrist
- Don respirator and check for secure fit
- Put hood or head covering over the respirator
- Put on remaining protective equipment, i.e. hard hat, safety glasses, etc.

One person will remain outside the work area to check that each person entering has the proper protective equipment. No persons will be allowed to enter an EZ improperly attired.

5.3.2 Doffing Procedures

Whenever a person leaves the work site, the following proper decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated mud and debris from boots or remove boot covers.
- Clean reusable protective equipment (i.e., face shields, hard hat, etc.).
- Remove protective garments and equipment leaving inner gloves on. All disposable clothing should be placed in plastic bags and labeled as contaminated waste.
- Remove respirator.
- Remove and dispose of inner gloves.

- Proceed to the clean area and dress.
- Clean respirator with new latex gloves on and prepare for next use.
- Proceed to the sign out point.

All disposable equipment, garments, and PPE will be bagged in a 6 mil plastic bag and properly labeled for disposal.

6.0 Site Control

Site control requires establishing specific measures to prevent unauthorized entry onto the site and to protect all personnel entering the site from recognized safety and health hazards.

No IT employee or subcontractor will be admitted onto NWS Yorktown without first obtaining an identification badge through the Pass Office. Personnel must bring a valid picture identification along with proof of citizenship in order to be issued a pass.

Once the Pass is issued, the Project Manager and the Site Superintendent may grant authorization to enter the site. Access to contaminated work areas is regulated and limited to authorized personnel. Only those who have completed the required training and medical requirements established in Sections 9.0 and 10.0 will be allowed to enter. Representatives from regulatory agencies will be permitted to enter the site at any time during business hours or at other reasonable times, by appointment, to conduct official business, provided they have completed the required training and medical requirements. Representatives of the news media and other visitors must receive authorization from the client and the IT Project Manager, before entry.

7.0 Decontamination

7.1 Contamination Control Zones

The SSHC will establish contamination control zones for the project based on the location of contamination, accessibility, and site control. These zones will be established during site mobilization and communicated to the site crew prior to remedial field activities. Warnings signs and barrier tape will be affixed in readily visible locations to delineate the EZ, CRZ and SZ and prevent unauthorized entries. In extreme cases, NWS Yorktown Security will be called to remove trespassers.

7.1.1 Exclusion Zone

An EZ is the area where contamination does or could occur during site activities. This zone has the highest potential for exposure to the contaminants by contact or inhalation. All employees will use proper personnel protective equipment when working in these areas. The EZ will be a defined area where there is a possible respiratory and/or contact health hazard. The location of the EZ will be identified by fencing or other appropriate means. An entry log is kept daily which records the time of entry into and exit from the EZ for each person.

7.1.2 Contamination Reduction Zone

A CRZ will be established and decontamination will be performed in the CRZ. All personnel entering or leaving the EZ will pass through this area in order to prevent any cross-contamination and for the purpose of accountability. Tools and any equipment or machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and properly labeled.

7.1.3 Support Zone

SZ are established in uncontaminated areas and are used for the storage of supplies and general administrative functions. The SZ will be located to prevent employees from being exposed to any dust levels above regulatory limits. Eating, drinking, or smoking will be permitted in the SZ only after washing face and hands.

7.2 Decontamination General Rules

- An area outside of the EZ will be designated as the break area. Employees will proceed through personal decontamination before eating, drinking or smoking. No eating, drinking or smoking will take place in the EZ.
- The SSHC will monitor the effectiveness of the decontamination procedures and if ineffective will take appropriate steps to correct any deficiencies or modify the plan as needed.
- Used coveralls, gloves and overboots will be dropped into a bag-lined garbage can for disposal at an approved facility.
- Spent disposable respirator cartridges will be dropped into a bag-lined garbage can.
- Clean respirators, hard hats, goggles and face shields will be placed on the work table at the clean end of the zone.
- Soiled boots, hard hats, respirators and other equipment will be inspected daily, washed and scrubbed in a detergent/water solution. After cleaning, equipment will be rinsed thoroughly in water and allowed to dry on a clean surface.
- If there is a rip or tear in the employee's protective clothing, that individual will remove the torn garment in the decontamination area and new protective clothing will be issued in order for the employee to return back to work. The same procedure will apply to defective respiratory equipment.

7.3 Equipment Decontamination

The purpose of the CRZ is to limit the spread of contamination by contaminated personnel, tools, equipment and materials from the EZ. Any person, tool, equipment or material from inside the EZ will be considered contaminated and must be cleaned before leaving the work site. Decontamination of all large equipment will be performed on site (prior to personnel decontamination). Visual verification that all equipment has been properly decontaminated will be the responsibility of the Site Superintendent and the SSHC. All contaminated solvents and waters generated from the cleaning operation will be collected and containerized for disposal.

One or more of the following steps will be used to decontaminate equipment:

1. Water rinse (if ineffective, go to step 2)
2. Steam jet (if ineffective, go to step 3)

3. Scrubbing (if ineffective, go to step 4)
4. Cleaning agent/solvent (if ineffective, repeat steps 1-4).

Once the equipment is adequately decontaminated to the satisfaction of the Site Superintendent and SSHC the process will stop.

7.4 PPE Decontamination

At least one person will remain outside the work area to assist decontaminating personnel in the CRZ and to assist in case of an emergency.

Whenever a person leaves the work site, the following proper decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated mud, etc. from boots or remove boot covers.
- Remove protective garments and equipment leaving inner latex gloves on. All disposable clothing should be placed in plastic bags and labeled as contaminated waste.
- Reusable protective equipment must be cleaned at the job site.
- Remove respirator and then inner latex gloves.
- Proceed to shower and then to clean area to dress.
- Clean respirator and prepare for next use.
- Proceed to the sign out point.

All disposable equipment, garments and PPE will be bagged in one 6 mil plastic bag and properly labeled for disposal at the job site.

7.5 Decontamination During Medical Emergencies

The SSHC or emergency-care provider will quickly assess the extent of the injury or illnesses to determine if life-saving medical treatment is crucial or if the decontamination procedures will create additional injuries and aggravate the existing condition. Under such circumstances, decontamination procedures will be greatly modified, simplified, or eliminated completely.

Life threatening injuries will be attended to immediately. Respiratory equipment must be removed and outside garments can be removed or cut away if it does not cause delays in treatment or cause further injury to the individual. Care will be taken to minimize the spread of contamination to emergency response personnel and transport vehicle by placing towels, blankets or plastic beneath the victim.

8.0 Site Monitoring

8.1 Air Monitoring

Measurements of airborne VOCs will be conducted in the work area by using an Hnu photo-ionization analyzer with a 11.7 eV lamp. VOCs will be monitored in the breathing zones of employees.

Measurements of oxygen and combustible gases will be made using a combination oxygen/combustible gas monitor.

Real-time air monitoring will be performed for total airborne particulates using a Miniram aerosol monitor. Results will be used to determine the effectiveness and/or need for dust control methods and to trigger action levels as specified in Table 8-2.

All air monitoring equipment will be maintained and calibrated according to the manufacturer's recommendations. Calibration will be done before and after use each day and under the approximate environmental conditions, the instrument will be used. All air monitoring activities will be documented on the equipment calibration log.

If an instrument is found to be inoperative or suspected of giving erroneous reading, the SSHC shall be responsible for immediately removing the instrument from service and obtaining a replacement unit. The specific IT or subcontractor operation for which this equipment is essential shall cease until an appropriate replacement unit is obtained. The SSHC will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

When applicable, only manufacturer-trained and/or authorized IT personnel will be allowed to perform instrument repairs or preventive maintenance.

All air monitoring results will be made available to the USN upon request.

8.2 Other Hazardous Conditions

The SSHC will take affirmative action to limit exposures. If unknown chemicals or contamination are encountered, operations will cease until the situation is evaluated. The SSHC

will contact the H&S Manager to evaluate any potentially hazardous situations, or any situation with elevated contamination levels. Operations will only be resumed if they can be accomplished in a safe manner.

8.3 Noise Monitoring

Noise monitoring will be conducted as required using a Quest 2400 noise meter or equivalent. Hearing protection is mandatory for all employees in noise hazardous areas or when operating heavy equipment. Noise monitoring will occur when new heavy equipment is brought on site and when new tasks are started that have not previously had their noise levels quantified.

8.4 Hearing Conservation

All on site personnel will wear hearing protection (E.A.R. foam inserts or equivalent) when operating heavy equipment or whenever noise levels exceed 85 dBA, according to IT Procedure HS402. All personnel required to wear hearing protection will receive baseline and an annual audiogram and training on the causes and prevention of hearing loss.

8.5 Record Keeping

The SSHC or his designee will be responsible for establishing and maintaining records of all required monitoring as described below:

- Date, time, location, pertinent task, and exposure information
- Description of equipment used, calibration data
- Type of PPE worn
- Engineering controls used to reduce exposure
- Sampling location
- Work operations taking place during monitoring
- Meteorological data
- Signature of sample collector.

TABLE 8-1 INTERNATIONAL TECHNOLOGY CORPORATION
Air Monitoring Frequency and Location

WORK ACTIVITY	INSTRUMENT	FREQUENCY	LOCATION
Site Survey	Hnu	Periodically	BZ ¹ of employees
	O ₂ /LEL meter	N/A	N/A
	Miniram dust monitor	N/A	N/A
Clearing and grubbing	HNU	Periodically	BZ of employees
	O ₂ /LEL meter	N/A	N/A
	Miniram dust monitor	Continuously	Work area
Soil sampling	Hnu	Periodically	BZ of employees
	O ₂ /LEL meter	Periodically	Surface level
	Miniram dust monitor	Continuously	Work area
Access road and lay down area construction	Hnu	N/A	N/A
	O ₂ /LEL meter	N/A	N/A
	Miniram dust monitor	Continuously	Work area
Excavation of contaminated materials	Hnu	Continuously	BZ of employees
	O ₂ /LEL	Periodically	Surface level
	Miniram dust monitor	Continuously	Work area
Excavation and handling of soil/batteries	Hnu	Continuously	BZ of employees
	O ₂ /LEL	Periodically	Surface level
	Miniram dust monitor	Continuously	Work area
Drum removal and sampling	Hnu	Continuously	Surfaces of drum
	O ₂ /LEL meter	Continuously	Surfaces of drum
	Miniram dust monitor	Continuously	Work area
	Radiation monitor	Periodically	Surface of drum
Containerize, pump, and sample water	Hnu	Periodically	BZ of employees
	O ₂ /LEL meter	N/A	N/A
	Miniram dust monitor	N/A	N/A
Equipment decontamination	Hnu	Periodically	BZ of employees
	O ₂ /LEL meter	N/A	N/A
	Miniram dust monitor	Continuously	Work area
Site restoration	Hnu	N/A	N/A
	O ₂ /LEL meter	N/A	N/A
	Miniram dust monitor	N/A	N/A

¹Breathing Zone

Table 8-2 Action Levels

INTERNATIONAL TECHNOLOGY CORPORATION

Level B PPE¹

Analyte	Action Level ²	Required Action
Unknown VOC's O ₂ LEL Total dust	≥100 ppm above background in BZ ≥23% or ≤20% ≥10% of LEL ≥10 mg/m ³	Stop work ³ Stop work Stop work Stop work

Level C PPE

Analyte	Action Level	Required Action
Unknown VOC's O ₂ LEL Total dust	≥10 ppm above background in BZ ≥23% or ≤20% ≥10% of LEL ≥5 mg/m ³	Level B PPE Stop work Stop work Level B PPE

Level D PPE

Analyte	Action Level	Required Action
Unknown VOC's O ₂ LEL Total dust	≥1 ppm above background in BZ ≥23% or ≤20% ≥10% of LEL ≥0.5 mg/m ³	Level C PPE Stop work Stop work Level C PPE

Support Zone

Analyte	Action Level	Required Action
Unknown VOC's	≥1 ppm above background in BZ	Evacuate support zone and re-establish perimeter of EZ.
Total dust	≥0.5 mg/m ³	Evacuate support zone, re-establish perimeter of EZ and initiate dust suppression controls.

¹When removing and sampling drums, the action levels in Section 4.7.6 will be followed.

²Four instantaneous peaks in any 15-minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response.

³The H&S Manager must be notified when these conditions are encountered prior to continuance of work.

9.0 Employee Training

9.1 OSHA Training

IT trains all field personnel according to 29 CFR 1910.120 before their initial assignment to any project. The following criteria is used to determine the level of training for IT employees, visitors, and subcontractors engaged in site activities.

- Personnel engaged in hazardous substance removal or other activities which expose or potentially expose them to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off site, and three days of supervised field experience.
- Personnel who perform limited activities at the site and are not potentially exposed to contaminate levels above the PEL shall receive a minimum of 24 hours of instruction off site, and one day of supervised field experience.

9.1.1 40-Hour Training

The following is a general list of topics covered in the 40-hour course:

- General site safety
- Physical hazards (fall protection, noise, heat stress, cold stress)
- Key management positions responsible for site safety and health
- Safety, health and other hazards
- Use of PPE
- Work practices by which employees can minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards
- Worker Right-to-Know (Hazard Communication)
- Engineering controls and safe work practices

- Components of the site H&S program
- Decontamination practices for personnel and equipment
- Confined space entry procedures
- ERP.

9.1.2 24-Hour Training

The same topics presented in the 40-hour course are reviewed in the 24-hour course with less time spent on each topic.

9.1.3 Supervisor Training

Site supervisory personnel shall receive eight additional hours of specialized training on program supervision. The following topics are discussed:

- Overall safety and health program
- Personal protection equipment program
- Spill containment program
- Air monitoring techniques.

9.1.4 Refresher Training

Personnel covered by Sections 9.1.1 and 9.1.2 are required to complete eight hours of refresher training annually on the following topics:

- Safe work practices
- Chemical hazard awareness
- Hearing conservation
- Hazard communication
- Respirator refresher
- Confined space entry procedures update.

9.1.5 Supervised Field Experience

Personnel covered by Section 9.1.1 will receive a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. A minimum of one day is required for personnel who fall under the requirements of 9.1.2.

9.2 Tailgate Safety Meetings

The SSHC conducts a tailgate safety meeting the beginning of each shift or whenever new employees arrive at the job site once the job commences. The topics discussed at the tailgate safety meeting include H&S considerations for the day's activities, necessary protective equipment, problems encountered and new operations. Attendance records and meeting notes are maintained with the project files.

9.3 Material Safety Data Sheets

MSDS will be obtained for every chemical product used on site. This information will be made readily available to all employees upon request and stored in a central location. MSDSs will be reviewed with all site employees during site specific training.

9.4 Site Specific Training

IT provides site specific training for all personnel assigned to projects falling within the scope and application of 29 CFR 1910.120. The H&S Manager will conduct this training at the FADS project site. The content of the training will be derived from information contained within this SSHP. All workers must also read and sign the SSHP acknowledging acceptance of site rules and understanding of site hazards before being permitted to enter the exclusion zone.

9.5 First Aid and CPR

At least two persons trained in a minimum of both American Red Cross FA techniques and CPR will be on site whenever activities occur. The IT bloodborne pathogen procedure (HS 512) is provided in Appendix F.

9.6 Instructors

The IT Training Division, headquartered in Irvine, California, teaches the 40-hour classes using certified instructors. When training needs exceed the capacity of the Training Division, IT uses outside institutions. IT Training Division is recognized by EPA and listed in the Federal Register (53 FR 3982). Only similarly recognized outside training institutions are used.

10.0 Medical Surveillance

IT will utilize the services of a Board-Certified Occupational Medicine physician for the medical surveillance requirements for this project. Dr. David Barnes (below) will review all medical examinations and will be available for medical consultation on an "as-needed" basis.

Dr. David Barnes
4360 Chamblee Dunwoody Road, Suite 207
Atlanta, Georgia 30341
(404) 455-0818 and (800) 229-3674

10.1 Medical Examination

As required by IT Policy and Procedure HS100 all personnel on site will have successfully completed a preplacement or periodic/updated physical examination.

10.1.1 Preplacement Exam

This examination has been designed to meet 29 CFR 1910.120 requirements for hazardous waste site operations.

The IT medical surveillance program examination consists of:

- Medical and occupational history questionnaire which includes information on past gastrointestinal, hematologic, renal cardiovascular, reproductive, immunological and neurologic problems.
- Physical examination.
- Blood pressure measurements.
- CBC and differential to include hemoglobin and hematocrit determinations, red cell indices, and smear of peripheral morphology.
- Blood urea nitrogen and serum creatinine.
- SMAC 24
- Pulmonary function test.
- Audiogram.

- EKG for employees over 35 years old or when other complications indicate the necessity.
- Drug and alcohol screening.
- Visual acuity.

The following information is provided to the examining physician:

- Description of employee's duties
- Anticipated chemical exposure and levels
- Description of the PPE to be used
- Information from previous medical exams.

The medical surveillance provided to the employee includes a judgment by the medical examiner of the ability of the employee to use either positive- or negative-pressure respiratory equipment. Any employee found to have a medical condition which could directly or indirectly be aggravated by exposure to these chemical substances or by the use of respiratory equipment will not be employed for the project. A copy of the medical examination is provided at the employee's request.

The employee will be informed of any medical conditions that would result in work restriction or that would prevent them from working at hazardous waste sites.

10.1.2 Annual Exam

All IT employees receive an annual update exam meeting the requirements of 29 CFR 1910.120. The results of these exams are compared to previous results and the baseline physical to determine if any effects due to exposure have occurred. Appropriate actions are taken as recommended by the physician should the results indicate an exposure; otherwise, employees are cleared for continued work.

10.1.3 Exit Exam

IT offers exit physical exams for all employees involved in the medical surveillance program who are leaving the company for any reason to ensure they are in good health.

10.2 Subcontractor Requirements

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician on the Certification Form (Appendix B). The physical examinations will meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134 Respiratory Protection. Subcontractors will also supply copies of the medical examination certificate for each employee they have on site.

10.3 Medical Records

Medical and personal exposure monitoring records will be maintained according to the requirements of 29 CFR 1910.120 and will be kept for a minimum of 30 years. Confidentiality of employee medical records will be maintained.

11.0 Emergency Procedures

IT develops each SSHP to allow hazardous waste operations to proceed without adverse impacts on the safety and health of the worker, the environment and the community.

11.1 General

The Site Superintendent and SSHC will establish evacuation routes and assembly areas for each site. All personnel entering the site are informed of these routes and assembly areas. A site plan will be prepared marking the evacuation routes and will be posted at conspicuous locations prior to site activities.

The Site Superintendent and SSHC will evaluate each site for the potential for fire, explosion, chemical release or other catastrophic events. As part of site specific training, site workers are instructed to report unusual events, activities, chemicals and conditions to the SSHC.

11.2 Emergency Equipment

Emergency equipment will be located in readily accessible uncontaminated locations. A complete first-aid kit and a fire extinguisher will be readily available on site for use in the event of an emergency. The fire extinguisher will be located not more than 25 feet from the work activity. In addition, an eyewash will be readily available and must be capable of washing both eyes at once and delivering at least 0.4 gallons per minute for at least 15 minutes. At least one eyewash will be maintained in each site's contamination reduction zone (CRZ).

11.3 Emergency Response

The objective of emergency response actions is to minimize adverse health risks to site workers, the environment and the local community. The SSHC will have the authority to commit resources as needed to contain and control released material and to prevent its spread to off-site areas. An emergency drill will be conducted early in the project to evaluate the effectiveness of the plan. Any deficiencies noted will be communicated to the site crew.

11.4 Safety Signals

Vehicle, tractor and portable gas-operated horns are used for safety signals as follows:

- 1) Long Blast: Warning alarm - prepare for Emergency Response

- 2) Multiple Short Blasts: Activation alarm - initiate Emergency Response activities as directed by SSHC or as discussed in Tailgate Safety Meeting.

Gas operated horns will be located in various areas on site including:

- Vehicles or heavy equipment which do not have a fixed operable horn
- CRZ
- Support zone trailer
- Each active work area.

11.5 Site Evacuation Plan

In the event of a large fire, explosion, or toxic vapor release, the site alarm system will sound (multiple short blasts) and the following steps will be initiated:

- Stop all site activities and evacuate to the predetermined up-wind rally point
- The SSHC will designate an employee to contact the Navy Technical Representative (NTR) and give all pertinent information including:
 - Time/type of incident
 - Wind direction
 - Opinion on necessity of community evacuation.
- The NTR will be responsible for coordinating community evacuations if necessary
- All personnel in the EZ will exit through the CRZ if possible, and perform a rough decon (removal of outer clothing and scrub boots)
- A head count will be taken at the rally point
- The SSHC will then determine the required response action
- A response team may then be assembled to search for missing personnel or correct the problem.

11.6 Fire

Any fire should be immediately reported to the SSHC and Site Superintendent. If the fire is in the SZ, fire extinguishers will be used to contain or extinguish the fire. Fires in the CRZ or the EZ require immediate input from the SSHC before initiating a response.

Immediate fire fighting should be attempted only on fires occurring in the SZ. The desired response depends upon type and size of fire:

- Small fires
 - Extinguish if possible
 - Notify Site Superintendent and SSHC
 - Notify NTR.
- Moderate fires
 - Extinguish if possible
 - Notify Site Superintendent and SSHC
 - If unable to extinguish, notify fire department
 - Alert site workers
 - Notify NTR.
- Large fires
 - Notify fire department
 - Notify Site Superintendent and SSHC
 - Notify NTR.

11.7 Spill Response

If a spill of hazardous material occurs, the following actions will be taken by personnel who have completed supervisory training:

- Notify the SSHC and Site Superintendent immediately (the Site Superintendent will notify the NTR)
- Take immediate measures to control and contain the spill within site boundaries
- Keep unnecessary personnel away, isolate the hazardous area, and deny entry
- Stay upwind and keep out of low-lying areas
- Allow no flares, smoking, or flames in hazard area

- For liquids, keep combustibles away from the spilled material
- Take necessary steps to clean up the spill and all contaminated material.

11.7.1 Small Dry Spills

Shovel contaminated materials into dry containers and cover. Use care not to make material airborne. Label the containers as to contents and remove to designated staging area.

11.7.2 Small Liquid Spills

Absorb the liquid with sand, clean fill, or other noncombustible, absorbent material. Place contaminated material into a container and label the contents prior to transporting to the designated staging area.

11.7.3 Transportation-Related Spills

In the event that hazardous substances will be transported off site, IT will employ the use of a qualified transportation company. This company will possess a U.S. EPA-certified emergency response plan which must include a contingency plan for spills.

11.8 Adverse Weather Conditions

In the event of adverse weather conditions, the SSHC will determine if operations can continue without the potential for injury to personnel. Conditions that may cause concern as well as assist in the determination of whether or not to continue field operations include, but are not limited to, the following:

- Potential for heat stress
- Severe thunderstorms
- Tornados
- Hailstorms
- Poor visibility.

11.9 Medical Emergency

If a person working in an area is physically injured, American Red Cross FA procedures will be followed. Depending upon the severity of the injury or illness, emergency medical response may be obtained accordingly. All persons responding, both on site and off site, will be informed of the site safety and health hazards associated with contaminated personnel. If the person can be

moved, that person will be taken to a location where emergency first aid treatment can be administered.

If the injury to the worker is of chemical nature, the following first-aid procedures will be instituted as soon as possible:

- Eye Exposure - If contaminated material gets into the eyes, the eyes will be flushed immediately at the eyewash station using copious amounts of water while lifting up the lower and upper eyelids.
- Skin Exposure - If contaminated sludge or corrosive liquid material gets on the skin, the affected area will be washed with soap or mild detergent.
- Inhalation - If an individual inhales a volume of toxic or corrosive vapors, the employee will be removed to fresh air at once. If breathing has stopped, artificial respiration will be performed on the affected individual until medical attention can arrive on scene and transport the patient to the nearest medial facility.
- Ingestion - In the event a person ingests a toxic liquid or solid material, medical attention will be obtained at once.

Emergency medical personnel will be summoned without delay in the event of a medical emergency.

11.10 Reporting Injuries and Illnesses

Employees will report all injuries to their supervisor immediately and report illnesses as soon as the employee knows he/she is sick. Supervisors will submit completed "Supervisor's Report of Injury" to the IT H&S Department within 24 hours of the occurrence. If there is any indication that the illness is work-related, the supervisor will submit a completed "Supervisor's Report of Injury" to H&S Department within 24 hours after notification by the employee.

11.11 Emergency Information

11.11.1 Public Agencies

FIRE

NWS Yorktown Fire Department
Emergency
Non-Emergency

(804) 887-4911
(804) 887-7343

POLICE	NWS Yorktown Police Department*	
	Emergency	(804) 887-4911
	Non-Emergency	(804) 887-4677

HOSPITAL/AMBULANCE	NWS Yorktown Emergency Medical Service	
	Emergency	(804) 887-4911
	Non-Emergency	(804) 887-7404

HOSPITAL LOCATION MAP	Refer to Appendix A-2
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CMA CHEMICAL REFERRAL CENTER	(800) 262-8200
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POISON CONTROL CENTER	(800) 282-3171
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ATSDR	(202) 690-7536
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NATIONAL RESPONSE CENTER HOTLINE	(800) 424-8802
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CHEMTREC	(800) 424-9300
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*Prior to initiating site work, the SSHC will visit the NWS Yorktown Emergency Medical Service office to discuss emergency capabilities, civilian treatment, ambulance service, site contaminants and the IT work activities and to determine the point of contact.

11.11.2 Key IT Personnel

<u>Position</u>	<u>Name</u>	<u>Contact Phone Number</u>
Program Manager	Jim Pollard	(412) 372-7701
Project Manager	Harry Dravecky	(412) 372-7701
H&S Manager	Warren Houseman	(412) 372-7701

11.11.3 Key Navy Personnel

<u>Position</u>	<u>Name</u>	<u>Contact Phone Number</u>
Navy Technical Representative (NTR)	Beth Melendez	(804) 887-4161
Remedial Project Manager (RPM)	Greg Hatchett	(804) 322-4589

APPENDIX A
SITE AND HOSPITAL LOCATION MAPS

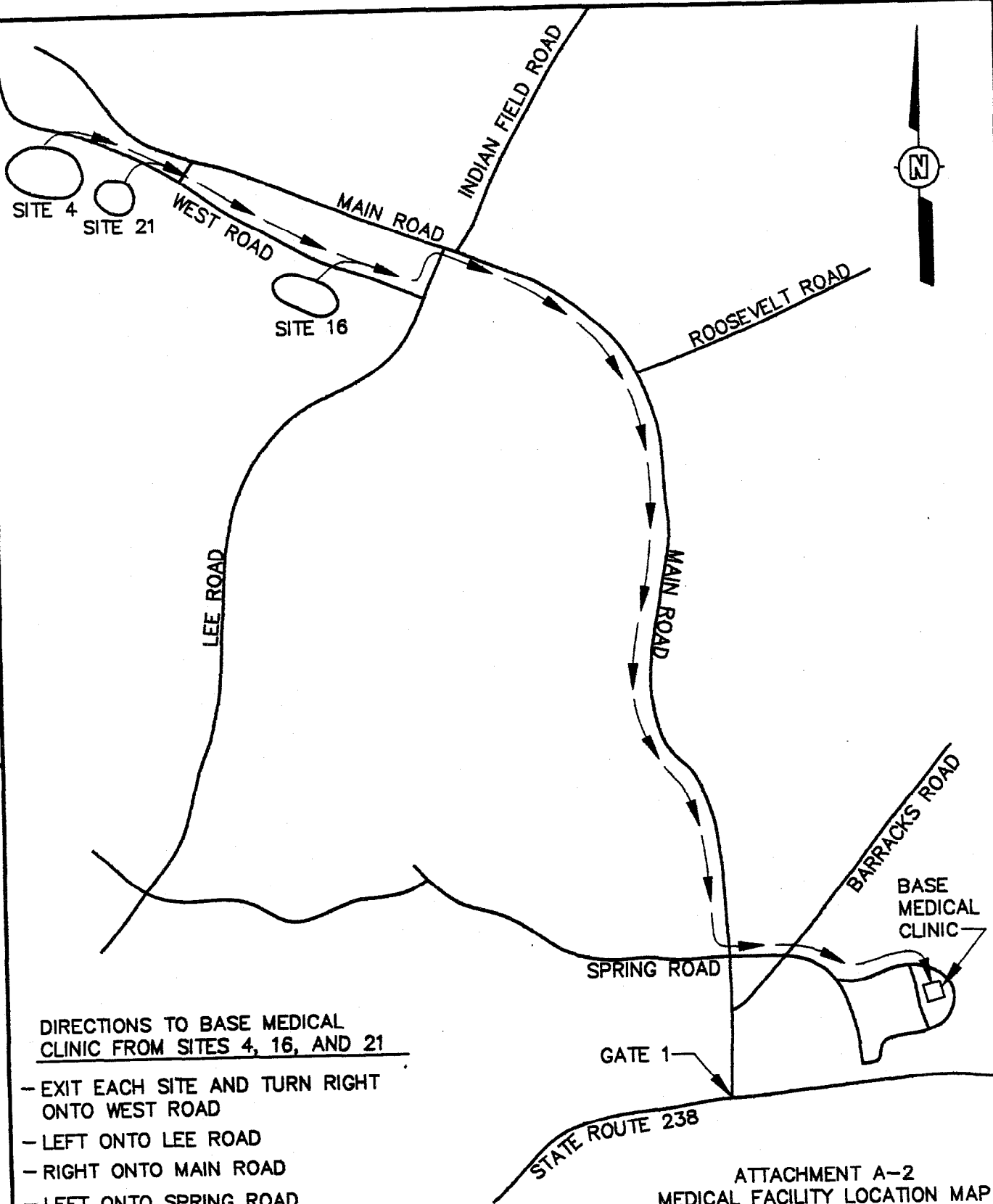
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NUMBER

CHECKED BY
APPROVED BY

D.E.S.
08-12-93

DRAWN
BY



DIRECTIONS TO BASE MEDICAL
CLINIC FROM SITES 4, 16, AND 21

- EXIT EACH SITE AND TURN RIGHT
ONTO WEST ROAD
 - LEFT ONTO LEE ROAD
 - RIGHT ONTO MAIN ROAD
 - LEFT ONTO SPRING ROAD
 - LEFT ONTO SECOND ROAD ON LEFT
 - CLINIC WILL BE ON RIGHT
- (804) 887-7404

"NOT TO SCALE"

ATTACHMENT A-2
MEDICAL FACILITY LOCATION MAP

PREPARED FOR

NEESA
PT. HUENEME, CALIFORNIA



APPENDIX B
CONTRACTOR CERTIFICATION

Contractor Certification

I, _____ as an agent of _____, do hereby certify that the following employees have successfully completed a 40-hour training course which complies with the provisions of 29 CFR 1910.120. Each employee has successfully completed a medical examination which complies with the above regulation.

Individual copies of certification of successful completion of the required training and medical examination are attached for each employee.

Signature

Date

Table 3-1 Toxicological Data

The following compounds are anticipated to be encountered at sites 4, 16, and 21, and many present a potential health hazard to project personnel. This list will be modified by the H&S Manager as site conditions warrant.

CHLORODIPHENYLS

Exposure Guidelines

- OSHA PEL, 0.5 mg/m³
- ACGIH TLV, 0.5 mg/m³

Routes of Entry

- Moderately toxic by ingestion, inhalation, and skin/eye contact

Symptoms of Exposure

- Inhalation - nausea, vomiting, loss of weight, jaundice, edema, abdominal pain, fatigue, and liver damage
- Ingestion - nausea, vomiting, loss of weight, jaundice, edema, abdominal pain, fatigue, and liver damage
- Eye/Skin Contact - Chloracne, sebaceous cysts, pustules, moderate eye irritation and carcinogenic

CHROMIUM

Exposure Guidelines

- OSHA PEL, 1 mg/m³
- ACGIH TLV, 0.5 mg/m³

Routes of Entry

- Highly toxic by inhalation
- Moderately toxic by ingestion and skin/eye contact

Table 3-1 Toxicological Data (continued)

Symptoms of Exposure

- Ingestion - effects have not been well defined
- Inhalation - irritation of nose and throat, chest pain and shortness of breath; carcinogenic
- Skin/Eye - corrosive action on skin with moderate irritation of eyes

LEAD

Exposure Guidelines

- OSHA PEL, 0.05 mg/m³
- ACGIH TLV, 0.15 mg/m³

Routes of Entry

- Highly toxic by inhalation and ingestion
- Moderately toxic by skin/eye contact

Symptoms of Exposure

- Ingestion - decreased physical fitness, fatigue, sleep disturbances, headache, constipation, abdominal pains, and decreased appetite
- Inhalation - decreased physical fitness, fatigue, sleep disturbance, headache, constipation, abdominal pains, and decreased appetite
- Skin/Eye - itching, burning, and transient redness

COAL TAR PITCH VOLATILES

Exposure Guidelines

- OSHA PEL, 0.2 mg/m³
- ACGIH TLV, 0.2 mg/m³

Table 3-1
Toxicological Data
(continued)

Routes of Entry

- Moderately toxic by inhalation and skin/eye contact
- Unlikely to be ingested

Symptoms of Exposure

- Inhalation - CNS depression, headache, nausea, dizziness, nervousness, and convulsions; carcinogen
- Skin/Eye Contact - skin irritation, conjunctiva, and photosensitivity with prolonged contact

TRINITROTOLUENE (TNT)

Exposure Guidelines

- OSHA PEL, 1.5 mg/m³
- ACGIH TLV, 0.5 mg/m³

Routes of Entry

- Highly toxic by eye/skin contact
- Moderately toxic by ingestion and inhalation

Symptoms of Exposure

- Inhalation - irritation of nose and throat with sneezing, cough, weakness, and drowsiness
- Ingestion - hallucinations, cyanosis, gastrointestinal changes, headache, weakness, anemia, and heart irregularities
- Skin/Eye Contact - cataracts, irritation of eyes, aplastic anemia, dermatitis with yellow staining of skin, hair, and nails

Table 3-1
Toxicological Data
(continued)

CYCLOTETRAMETHYLENETETRANITRAMINE (HMX)

Exposure Guidelines

- OSHA PEL, not established
- ACGIH TLV, 1.5 mg/m³

Routes of Entry

- Moderately toxic by ingestion, inhalation, and eye/skin contact

Symptoms of Exposure

- Inhalation - insomnia, restlessness, irritability, and dizziness
- Ingestion - nausea, vomiting, convulsions, abdominal cramps, and central nervous system depression
- Skin/Eye Contact - watery eyes and moderate skin irritation

TRIMETHYLENETRINITRIAMINE
(very similar effects as HMX listed above)

Table 3-2
Flying Insects

Organism	Description	Habitat	Problem	Severity	Protection
Hornet	One inch long with some body hair. Abdomen is mostly black.	Round, paperlike nest hanging from trees, shrubs, or under eaves of buildings.	One nest may contain up to 100,000 hornets which will attack in force at the slightest provocation.	Severe pain, allergic reactions similar to bees.	Do not come near or disturb nest. If a hornet investigates you, do not move.
Mosquito	Small, dark, fragile body with transparent wings. From 1/8 to 1/4 inch long.	Where water is available for breeding.	Bites and sucks blood. Itching and swelling result.	Can transmit encephalitis and other diseases. Scratching causes secondary infections.	Use plenty of insect repellent and wear gloves. Stay in windy areas.
Wasp	Very thin waist. Color can be black, yellow or orange with stripes.	Underground nest. Paperlike honeycomb nest in abandoned buildings hollow trees, etc.	Stings. Some species will attack if you get too close to the nest.	Severe pain, allergic reactions similar to bees. Can be fatal.	Avoid Nest. Do not swat at them.
Bee	Generally has yellow and black stripes and two pair of wings.	Hollow logs, underground nest, old buildings,	Stings when annoyed. Leaves venom sac in victim.	If person is allergic, nausea, shock, constriction of the airway can result. Death may result.	Be careful and watch where you walk. Cover exposed skin. Avoid areas where bees are swarming. Avoid wearing sweet fragrances and bright clothing. Move slowly or stand still when bees are swarming about you.

**Table 5-1
PPE Selection Matrix**

<u>ACTIVITY</u>	<u>PPE</u>
Task 1 - Site Survey	Level D2 - Modified
Task 2 - Clearing and grubbing	Level D1 - Modified
Task 3 - Soil sampling	Level D2 - Modified
Task 4 - Access road and lay down area construction	Level D
Task 5 - Excavation of Contaminated Materials	
• Site 4	Level C
• Site 16	Level C*
• Site 21	Level B
Task 6 - Excavation and Handling of Soil/Batteries	
• Site 4	Level C
• Site 16	Level C
• Site 21	Level B
Task 7 - Drum removal and sampling	Level B
Task 8 - Containerize, pump, and sample water	Level D1 - Modified
Task 9 - Equipment decontamination	Level C
Task 10 - Site restoration	Level D

*Five-minute emergency escape units will be worn when not wearing Level B during intrusive activities

As site activities progress, levels of PPE are subject to change or modification. Upgrading of PPE can occur when action levels are exceeded or whenever the need arises to protect the safety and health of site personnel. Levels of protection will not be downgraded without prior approval from the H&S Manager.

Level B PPE

- Coverall or surgical scrub
- Neoprene steel toed boots
- Pressure demand full face supplied air respirator with five minute emergency egress bottle
- Hard hat
- Nitrile gloves (outer)
- Latex gloves (inner)
- Polyethylene-coated Tyvek coveralls with hoods and elastic wrists and ankles
- Duct tape openings (ankles, wrist, and respirator)
- Hearing protection (if necessary)

Level C PPE

- Coverall or surgical scrubs
- Neoprene steel toed boots
- Full face air purifying respirator with high efficiency particulate air (HEPA) and organic vapor cartridges
- Hard hat
- Nitrile gloves (outer)
- Latex gloves (inner)
- Polyethylene-coated Tyvek coveralls with hoods and elastic wrists and ankles

Table 5-1
PPE Selection Matrix
(continued)

- Duct tape openings (ankles, wrist, and respirator)
- Hearing protection (if necessary)

Level D1-Modified PPE

- Coverall or surgical scrubs
- Neoprene steel toed boots
- Safety glasses
- Hard hat
- Hearing protection (if necessary)
- Polyethylene-coated Tyvek coveralls with hoods and elastic wrists and ankles
- Nitrile gloves (outer)
- Latex gloves (inner)
- Face shield (when working with liquids)

Level D2-Modified PPE

- Coverall or work clothes
- Steel-toed safety boots
- Safety glasses
- Hard hat
- Hearing protection (if necessary)
- Leather palm gloves (if necessary)
- Latex boot covers
- Nitrile gloves

Level D PPE

- Coverall or work clothes
- Steel-toed safety boots
- Safety glasses
- Hard hat
- Hearing protection (if necessary)
- Leather palm gloves when handling materials

APPENDIX C

CONFINED SPACE ENTRY PROCEDURE



Approved by *[Signature]*

PROCEDURE

(subject) **CONFINED SPACES**

1.0 PURPOSE AND SUMMARY

This procedure describes the procedures for identifying and working within confined spaces throughout IT and for complying with OSHA regulations 29 CFR 1910.146. Additional requirements for special confined space applications can be found in the following procedures:

- HS301 Confined Spaces, Marine
- HS302 Confined Spaces, Leaded Product

Key provisions of this procedure include the following:

- Identification and posting of confined spaces at IT facilities.
- HASP requirements.
- Entry permit requirements for confined space entries.
- Testing and monitoring.
- Personal protective equipment, including lifelines and harnesses.
- Lighting.
- MSDS requirements.
- Rescue and emergency services and procedures.
- Communication between entrants and attendants.
- Duties of personnel.
- Training requirements.
- Entrant location tracking systems.
- Recordkeeping and retention.
- Annual program review.

2.0 TABLE OF CONTENTS

1.0	Purpose and Summary
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5.2	Evaluate the Workplace
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5.4	Permit-Required Confined Spaces
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7.0	Cross References
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3.0 RESPONSIBILITY MATRIX

- 3.1 **Procedure Responsibility.** The Corporate Director, Health and Safety is responsible for the issuance, revision and maintenance of this procedure.
- 3.2 **Action/Approval Responsibilities.** The Responsibility Matrix is Attachment 1.

4.0 DEFINITIONS

- 4.1 **Acceptable entry conditions** means the conditions that must exist in a permit space to allow entry so that employees involved with a permit-required confined space entry can safely enter into and work within the space.
 - 4.2 **Attendant** means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the IT permit space program.
 - 4.3 **Authorized entrant** means an employee who is authorized by IT to enter a permit space.
 - 4.4 **Blanking or blinding** means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.
 - 4.5 **Confined space** means a space that:
 - 4.5.1 Is large enough and so configured that an employee can bodily enter and perform assigned work;
 - 4.5.2 Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, pits, and excavations are spaces that may have limited means of entry); and
 - 4.5.3 Is not designed for continuous employee occupancy.
- See also definition 4.21.
- 4.6 **Double block and bleed** means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.
 - 4.7 **Emergency** means any occurrence (including any failure of hazard control or monitoring equipment) or event, internal or external, to the permit space that could endanger entrants.
 - 4.8 **Engulfment** means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.



- 4.9 Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.
- 4.10 Entry Permit (Attachment 3) means the written or printed document that is provided by IT to allow and control entry into a permit space and that contains the information specified in Paragraph 4.1 of this section.
- 4.11 Entry Supervisor means the person (such as the supervisor, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.
- 4.12 Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:
- 4.12.1 Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (LEL);
 - 4.12.2 Airborne combustible dust at a concentration that meets or exceeds its LEL;

NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.
 - 4.12.3 Atmospheric oxygen concentration below 20.0 percent or above 23.5 percent.
 - 4.12.4 Atmospheric concentration of any substance for which a dose or a published exposure guideline is available (Permissible Exposure Limit, PEL, from OSHA, Threshold Limit Value, TLV, from ACGIH, and Recommended Exposure Limits, REL, from NIOSH), and which could result in employee exposure in excess of its dose or permissible exposure limit.
 - 4.12.5 Any other atmospheric condition that is immediately dangerous to life or health.
- 4.13 Hot work permit means IT written authorization to perform hot operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition. This is a separate document from the entry permit.
- 4.14 Immediately Dangerous to Life or Health (IDLH) means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.
- 4.15 Inerting means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.



- 4.16 **Isolation** means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy, including hydraulic or electric; blocking or disconnecting all mechanical linkages; or physically restraining moving parts.
- 4.17 **Line breaking** means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.
- 4.18 **Non-permit confined space** means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.
- 4.19 **Oxygen deficient atmosphere** means an atmosphere containing less than 20.0 percent oxygen by volume.
- 4.20 **Oxygen-enriched atmosphere** means an atmosphere containing more than 23.5 percent oxygen by volume.
- 4.21 **Permit-Required Confined Space (PRCS)** means a confined space that has one or more of the following characteristics:
- 4.21.1 Contains or has a potential to contain a hazardous atmosphere;
 - 4.21.2 Contains a material that has the potential for engulfing an entrant;
 - 4.21.3 Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
 - 4.21.4 Contains any other recognized serious safety or health hazard.
- 4.22 **Prohibited condition** means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.
- 4.23 **Rescue service** means the personnel designated to rescue employees from permit spaces.
- 4.24 **Retrieval system** means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.
- 4.25 **Testing** means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.



5.0 TEXT

5.1 Scope and Applicability

This procedure contains the requirements for performing work in confined spaces throughout IT Corporation, specifically including construction.

5.2 Evaluate the Workplace

All facilities or project locations owned or operated by IT Corporation (including joint ventures) shall be evaluated to identify the presence of permit-required confined spaces. All such spaces shall be posted with a sign bearing the following or similar warning: "DANGER-PERMIT-REQUIRED CONFINED SPACE. DO NOT ENTER".

5.3 Non-Permit Confined Spaces

All confined spaces shall be initially considered permit-required confined spaces. Such spaces can be reclassified as non-permit confined spaces only under the following conditions:

- 5.3.1 Site-specific approval of an IT HS professional;
- 5.3.2 All contaminants, contaminated soils, and vessels containing contaminants have been removed;
- 5.3.3 All actual or potential atmospheric hazards have been eliminated, with testing verification;
- 5.3.4 Ventilation is not required to maintain control of atmospheric hazards;
- 5.3.5 All recognized hazards, including engulfment, within the confined space have been eliminated;
- 5.3.6 The confined space shall be re-evaluated (and reclassified to permit-required, if needed) whenever the use or configuration of the space changes in any way that might increase the hazards to the entrants. All entrants shall exit the space immediately when hazards are noted;
- 5.3.7 The entry supervisor shall make the certification that all hazards have been removed on the Entry Permit (Attachment 3); and
- 5.3.8 The Entry Permit (Attachment 3) shall be posted at the entrance to the confined space.

5.4 Permit-Required Confined Spaces

All confined space entries shall be considered permit-required until/unless the space meets the requirements in section 5.3.



5.4.1

Procedures and Practices for Permit Space Entry

Prior to beginning any confined space entry operation, a Health and Safety Plan (HASP) shall be developed and approved per IT Procedure HS052 requirements. The HASP must specifically address the following areas:

- Specify acceptable entry conditions. IT requires that combustible vapors shall not exceed 10.0 percent of the LEL and oxygen levels be between 20-23.5 percent by volume. Appropriate toxic gas/vapor action levels shall also be established (Level A or IDLH conditions require Corporate HS approval).
- Confined space isolation procedures.
- Lockout, tagout, tryout and return to service procedures for potential sources of hazardous energy at the specific project location (see also IT procedure HS315 Control of Hazardous Energy Sources).
- Procedures and equipment for purging, inerting, flushing or ventilating the space for the control of atmospheric hazards. Continuous mechanical ventilation shall be used whenever entrants are in the PRCS.
- Procedures for inspecting, monitoring and testing the confined space to verify that acceptable conditions exist prior to and throughout the entry operation. This includes:
 - Specific atmospheric tests to be performed and frequency of tests (NOTE: Confined spaces shall be tested as often as necessary to verify entrant safety, whenever operations or conditions change [e.g., temperature change or product agitation, etc.], and no less often than hourly.);
 - Specific testing equipment required;
 - For confined spaces that cannot be completely isolated (e.g., sewers, etc.), continuous testing with real-time direct reading instruments shall be required; and
 - Priority for atmospheric hazard testing shall be oxygen, combustible gases, then toxic gases/vapors.
- Personal Protective Equipment:
 - Protective suits, boots, and gloves - including specification of the material of construction.
 - Face, head, and foot protection.

- Specify chest or parachute harness with approved lifelines at least one-half inch in diameter and 2,000 pounds test and meeting ANSI A10.14 requirements. (NOTE: Wristlets may be used only when an IT HS professional finds that a harness presents a greater hazard to the employee and wristlets are the safest, most effective alternative.) All lifelines shall be secured to a mechanical device or fixed point outside the confined space. Mechanical extraction devices shall be used for all vertical entry permit spaces greater than five (5) feet deep.
- Respiratory protection, per IT procedure HS601.
- Material Safety Datasheets (MSDS) to be provided to the medical facility when treating injured/exposed entrants.
- Lighting equipment required to safely illuminate the work and provide emergency egress.

NOTE: Lighting and electrical equipment shall be of the appropriate National Electrical Code (NEC) rating. Rating should be Class I, Division I unless the space specifically meets other rating class requirements.

- Protective barriers to be used to protect entrants from external pedestrian, vehicle or equipment hazards.
- Ingress and egress equipment such as ladders.
- Rescue and emergency services, procedures, equipment, and Exposure Control Plan (see IT Procedure HS512). The HASP must specify whether IT or another source will provide these services and equipment, and how to summon them. IT shall provide rescue services unless the client has a qualified rescue team in-plant which is available to IT and has been informed of the hazards of the confined space to be entered.
- Communications equipment to provide continuous communication between entrants and attendants. This can be done using the standard system of lifeline "tugs" below, so long as the attendants continuously hold the lifelines in their hands.

Lifeline "Tug" Signals

- 1 Tug = Are you OK?
- 2 Tugs = Yes, I am OK.
- 3 Tugs = Exit the confined space immediately.



Any other signal, or an unclear signal, shall require immediate exit of the PRCS.

Other standard hand signals are provided in Attachment 2.

An alternative system would be to provide all entrants and attendants with an air powered horn. Substituting horn blasts for tugs, equivalent signals to the lifeline "tug" signals, would be standard. Any other or uncertain signals require immediate exit.

If this is not practical or possible, powered communication equipment with the appropriate NEC rating shall be provided.

- Prescribe the number of attendants and other outside support personnel. Each confined space being entered shall have a minimum of one (1) dedicated attendant and one other support person (who may have other duties) within sight or call.
- Designate the duties of entrants, attendants, and entry supervisors as described below.

Duties of authorized entrants

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.
- Alert the attendant whenever:
 - (1) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or
 - (2) The entrant detects a prohibited condition; and
- Exit from the permit space as quickly as possible whenever:
 - (1) An order to evacuate is given by the attendant or the entry supervisor,
 - (2) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
 - (3) The entrant detects a prohibited condition, or
 - (4) An evacuation alarm is activated.

Duties of attendants

- Know the hazards that may be faced during entry, including



information on the mode, signs or symptoms, and consequences of the exposure.

- Is aware of possible behavioral effects of hazard exposure in authorized entrants.
- Continuously maintains an accurate count of authorized entrants in the permit space so that the means used to identify authorized entrants accurately identifies who is in the permit space.
- Remains outside the permit space during entry operations until relieved by another attendant.
- Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
- Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
 - (1) If the attendant detects a prohibited condition;
 - (2) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
 - (3) If the attendant detects a situation outside the space that could endanger the authorized entrants; or
 - (4) If the attendant cannot effectively and safely perform all prescribed duties.
- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.
- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - (1) Warn the unauthorized persons that they must stay away from the permit space;
 - (2) Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
 - (3) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
- Performs non-entry rescues.



- Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Duties of Entry Supervisors

- Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- Terminates the entry and cancels the permit as required.
- Verifies that rescue services are available and that the means for summoning them are operable.
- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
- Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.
- Documents on the entry permit any incidents or circumstances requiring review of the confined space entry program. Such incidents include:
 - (1) Unauthorized entry;
 - (2) The detection of a condition/hazard not authorized by the permit;
 - (3) The occurrence of an injury or near-miss during entry;
 - (4) A change in use or configuration of the space; or
 - (5) Employee complaints about the program.
- Prescribes procedures for coordination of entry when personnel from multiple employers will work simultaneously. IT subcontractors shall follow IT procedures.

5.4.2

Permit System

Before entry is authorized, the Entry Supervisor shall complete and sign an Entry Permit (Attachment 3) to document that all pre-entry requirements in

the approved HASP have been met and that acceptable entry conditions exist. The completed permit shall be posted at the primary entrance to the confined space.

All Entry Permits are valid for a maximum of one (1) work shift, and shall be cancelled by the Entry Supervisor when the shift ends, confined space operations are complete, or whenever a prohibited condition arises in or near the space. All confined spaces shall be securely closed or barricaded whenever the entry permit is cancelled.

Entry Permits must be completely executed and include the following information:

- Identify the permit space to be entered;
- Purpose of the entry;
- Date and duration of the permit;
- Authorized entrants by name;
- Authorized attendants by name;
- The name and signature of the Entry Supervisor originally authorizing entry;
- The name and signature of the current Entry Supervisor;
- The hazards of the permit space to be entered;
- Measures used to isolate the permit space and control hazards;
- Acceptable entry conditions;
- Time and results of periodic atmospheric tests with the initials of the tester;
- Available rescue services and equipment, and how to summon;
- Communication procedures;
- Personal protective equipment, testing equipment and communications equipment; and
- Any additional permits issued to authorize work in the permit space.

Supplemental information regarding the location of each entrant shall be provided as described below:



- The current entry status of all entrants shall be logged on the Field Activity Daily Log (FADL), with a new entry made whenever the entry status of an entrant changes.
- Each entrant shall securely affix a tag bearing their name to the outside lifeline fitting which is attached to a secure point.

5.4.3

Training

- General

Prior to assignment to confined space entry work, all employees shall receive training in the hazards of confined spaces, work practices to control these hazards, and duties to be performed. Employee proficiency shall be established by testing and/or practical demonstration.

The IT Training Department shall maintain training records to include employee name and signature, date of training, and signature of the trainer.

Basic training requirements shall include:

- Entrants/Attendants: Hazards & Protection or Hazards Protection Limited & Site Remediation & Confined Space Update (or equivalent). Note that H&P done prior to April 1993 requires Confined Space Update.
- Entry Supervisors and/or Personnel Conducting Atmospheric Testing: Qualified Person (or equivalent).
- Rescue Service Personnel: Personnel assigned to provide emergency entry and rescue services shall be trained annually in the proper use of personal protective and rescue equipment. Such training shall include a simulated rescue exercise. In addition, rescue personnel shall be trained in the hazards and proper work practices for handling blood or other potentially infectious materials while providing first aid or CPR, and comply with the other requirements of IT Procedure HS512. All rescue personnel shall have current training and certification for first-aid and CPR.

Equivalent training must be approved by the IT Training Department prior to assignment to entry duties.

Personnel assigned to attendant duties shall be trained in non-entry rescue procedures.

- **Site-Specific**

Health and Safety Plan orientation and Tailgate Safety meetings will be used to provide site-specific training.

5.5 Retention of Inspection and Test Logs

A copy of all Entry Permits and other documents related directly to the PRCS entry (e.g., hot work permits, FADLs, etc.) shall be forwarded to the local or project HS Department.

5.6 Confined Space Entry Program Review

Annually in January, the HS professional responsible for each location performing confined space entry operations shall review all entry permits for incidents or problems occurring during entry. Incidents or problems include injuries, accidents, unauthorized entries, or any other event potentially indicating that improvements can be made in the confined space entry program. After review with appropriate operations personnel, recommendations for program

revision shall be forwarded to the Corporate HS office for review by the Corporate Safety Council.

6.0 EXCEPTION PROVISIONS

Variances to this procedure (HS300) may be requested in accordance with the requirements of IT Procedure HS013 Health and Safety Procedure Variance.

7.0 CROSS REFERENCES

HS013 Health and Safety Procedure Variance
HS052 Health and Safety Plans
HS301 Confined Spaces, Marine
HS302 Confined Spaces, Leaded Product
HS315 Control of Hazardous Energy Sources
HS512 Bloodborne Pathogens
HS601 Respiratory Protective Program

8.0 ATTACHMENTS

1. **Responsibility Matrix**
2. **Hand Signals**
3. **Entry Permit**

INTERNATIONAL TECHNOLOGY CORPORATION

CONFINED SPACES Responsibility Matrix

ATTACHMENT 1



Action	Procedure Section	Local HS	Corn HS	Training Dept.	Location Manager	Entry Supv	Manager
Identify and post all PRCs at IT facilities	5.2	X			X		
Develop HASP, including establishing acceptable entry conditions	5.4.1	X					X
Approve HASP prior to work:	5.4.1	X					X
If IDLH or Level A:	5.4.1	X	X				X
Provide adequate supplies of required equipment (e.g., rescue, air testing) at location	5.4.1				X		
Train adequate personnel in each category	5.4.3				X		
Retain training records	5.4.3			X	X		
Complete HASP requirements for entry, executive entry permit, and test/monitor	5.4.1					X	
Cancel entry permits	5.4.2					X	
Reclassify PRCs as non-permit-required	5.3					X	
Retain documents	5.5	X					
Program review	5.6	X	X		X		

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ATTACHMENT 2

HAND SIGNALS

- THE VERY NATURE OF OUR WORK REQUIRES THE USE OF PROTECTIVE CLOTHING THAT IN ITSELF MAY RESTRICT OUR ABILITY TO COMMUNICATE ORALLY.
- IN AS MUCH AS CERTAIN VITAL COMMUNICATIONS ARE NECESSARY FOR A SAFE EFFICIENT OPERATION, A LIMITED NUMBER OF HAND SIGNALS HAVE BEEN DEVISED TO HELP RESOLVE THIS PROBLEM.
- SIGNALS COVERING TWO CATEGORIES, THOSE FOR PERSONAL SAFETY AND FOR OPERATIONAL USE WILL BE DISCUSSED.

Personal Safety

- IMMEDIATE PERSONAL SAFETY PROBLEMS COULD INCLUDE BREATHING AIR SYSTEM MALFUNCTION, LIFELINES PROBLEMS AND GENERAL DISTRESS.

THE FOLLOWING SIGNALS WILL BE USED FOR ALL IT EMPLOYEES

- BREATHING AIR PROBLEMS



ONE HAND HOLDING THROAT
INDICATES A BREATHING
AIR PROBLEM



BOTH HANDS HOLDING THROAT
INDICATES A SERIOUS
BREATHING AIR PROBLEM,
SUCH AS NO AIR ,
VAPORS GETTING THROUGH, ETC.



HAND SIGNALS (con't)

- **LIFE LINE TEST**

ONE TUG ON EITHER END OF A LIFE LINE MUST BE ANSWERED BY TWO TUGS. IF A TUG IS NOT ANSWERED IT INDICATES A FOULED LINE MAN MUST BE REMOVED AND LINE CLEARED.

THREE TUGS , OR A STEADY PULL ON THE LINE INDICATES THAT THE MAN SHOULD LEAVE THE CONTAMINATED AREA.

- **GENERAL PROBLEM**



BOTH HANDS RAISED ABOVE THE HEAD ARE INDICATIVE OF SOME TYPE OF PROBLEM WHICH MAY REQUIRES EXIT FROM THE AREA AND REMOVAL OF PROTECTIVE CLOTHING.

ONCE THE SIGNAL IS RECEIVED AND UNDERSTOOD, THE PROBLEM CAN POSSIBLY BE FURTHER CLARIFIED BY POINTING TO AFFECTED AREA.



HAND SIGNALS (con't)



INDEX FINDER TWIRLING IN AN UPWARD
MOTION WHILE OPEN PALM COVERS
THE FINGER: OPEN SLOWLY

INDEX FINDER TWIRLING IN A DOWNWARD
MOTION WHILE OPEN PALM COVERS THE
FINGER: CLOSE SLOWLY



WHILE OPENING OR CLOSING VALVES, VENTS, ETC.,
THE FOLLOWING CAN BE USED:



INDEX FINGER TWIRLING IN
AN UPWARD MOTION:
OPEN NORMALLY



INDEX FINGER TWIRLING IN A
DOWNWARD MOTION:
CLOSE NORMALLY



Operational Safety HAND SIGNALS (con't)



**1 HAND MADE INTO FIST
WITH THUMB DOWN :
CLOSE EMERGENCY**



**1 HAND MADE INTO FIST WITH
THUMB UP: OPEN EMERGENCY**

**CHECKING FOR MATERIAL IN A VESSEL WHILE IN PROTECTIVE
CLOTHING CAN BE ANSWERED AS FOLLOWS:**



**TWO HANDS CLASPED IN FIST
WITH THUMBS POINTING UP:
VESSEL HAS MATERIAL IN IT.**



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HAND SIGNALS (con't) Operational Safety

CHECKING FOR MATERIAL IN A VESSEL WHILE IN
PROTECTIVE CLOTHING CAN BE ANSWERED AS FOLLOWS:



UMPIRE SIGNALING RUNNER SAFE:
VESSEL EMPTY



HAND SIGNALS (con't)



**SLASHING SIGNAL ACROSS THROAT:
CLOSE DOWN WHATEVER YOU ARE DOING—STOP**



**FIST IN PUMPING MOTION:
CLOSE DOWN WHATEVER YOU ARE DOING—STOP**



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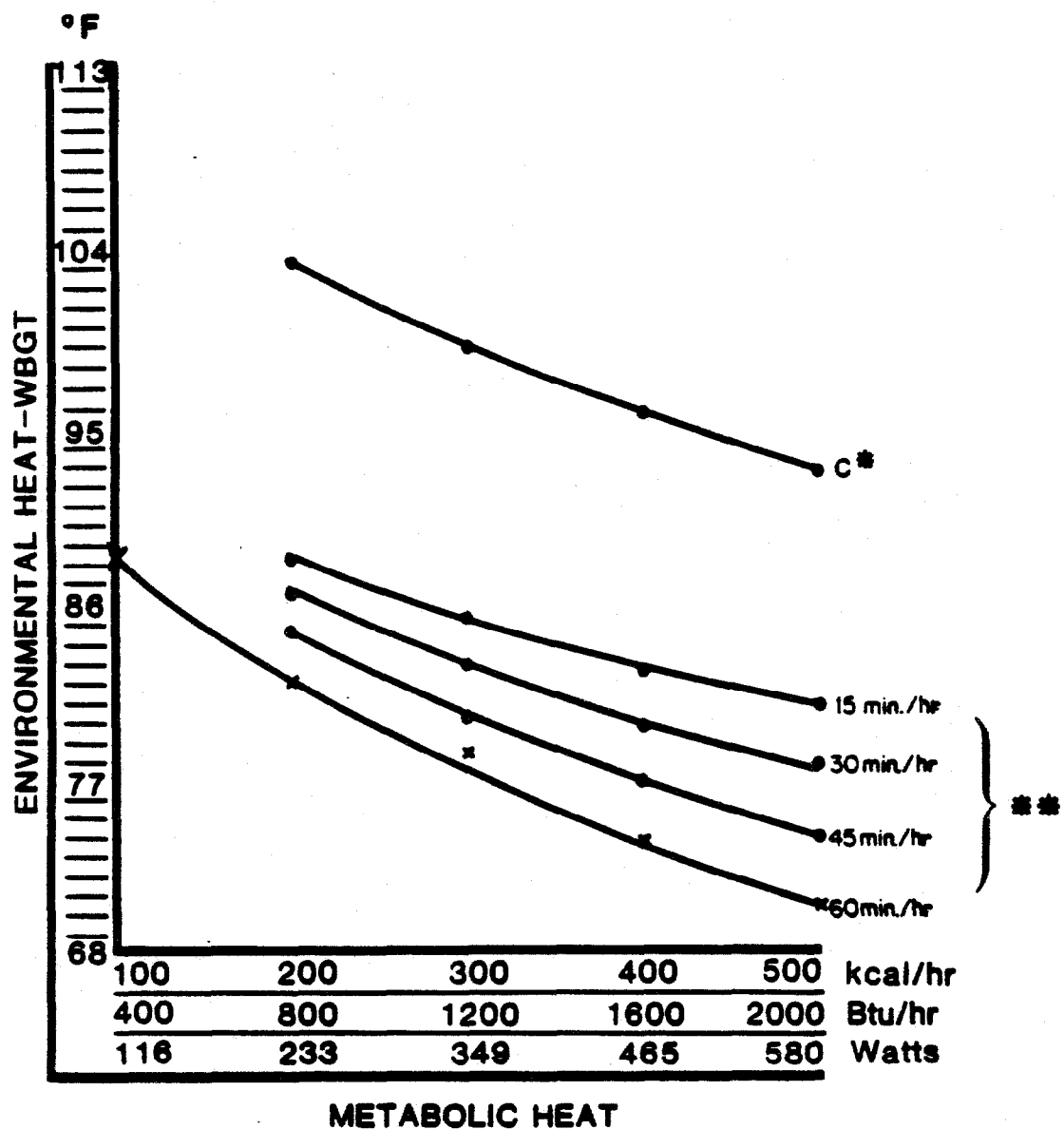
ENTRY PERMIT
PERMIT-REQUIRED CONFINED SPACE (PRCS)

ATTACHMENT 3

Division/Location _____ Job No. _____
Customer _____ Address _____
Location of Job _____ Identity of PRCS _____
Describe Hazards of PRCS (Chemical, Physical) _____
Chemical Introduced Into Space _____
Purpose This Permit Authorized _____

CHECKLIST	YES	DOES NOT APPLY	PERSONAL PROTECTIVE EQUIPMENT (Circle)
All lines leading to and from confined space have been blinded or disconnected			EYE/FACE Chemical Goggles Face Shield Safety Glasses
Electrical service disconnected or locked out			EXTREMITIES Hard Hat Gloves (Material _____) Hoods Boots (Material _____) Sooties
All grounding and bonding cables in place			BODY Suit (Level _____, Material _____)
All lighting, fittings, power equipment, and extension cords are explosion-proof			RESPIRATORY SCBA Air Line Egress System Air Purifying (Cartridge _____) Powered Air Purifying (Cartridge _____)
Ground Fault Circuit Indicator (GFCI) checked and functioning			OTHER Hearing Protection Harness & Lifeline Chert or Parachute
All ignition sources have been isolated			RESCUE EQUIPMENT Mechanical Extraction Device First Aid Kit SCBA Other (Specify) _____
All respiratory equipment and alarms checked and functional			NON-IT RESCUE TEAM Instructions to Summon Rescue _____
All safety harnesses and life lines checked			COMMUNICATION Lifeline "Tug" Signals (See NASP) Air Powered Horn Signals (See NASP) Other _____
All required PPE checked and in use			_____
All entrants are confined space trained			_____
All entrants are trained in the use, care, and limitations of respirators and PPE			_____
Attendant trained in emergency procedures			_____
Attendant(s) trained in rescue procedures			_____
Outside rescue service will be used and they have been notified of this entry			_____
Appropriate rescue equipment available and checked			_____
Ventilation system in use and effective			_____
Entrant(s) can achieve a gas-tight seal with respirator			_____
Entrant(s) are not wearing contact lenses			_____
All tests have been completed and indicate that entrance requirements have been met			_____
Appropriate warning signs have been posted and unauthorized personnel have been excluded from the PRCS and area			_____
IF THE ANSWER TO ANY OF THE ABOVE QUESTIONS IS NO, ENTRY IS NOT PERMITTED.			
OTHER PERMITS ISSUED FOR WORK IN PRCS: _____			
OTHER HAZARD CONTROL PROCEDURES OR INSTRUCTIONS: _____			

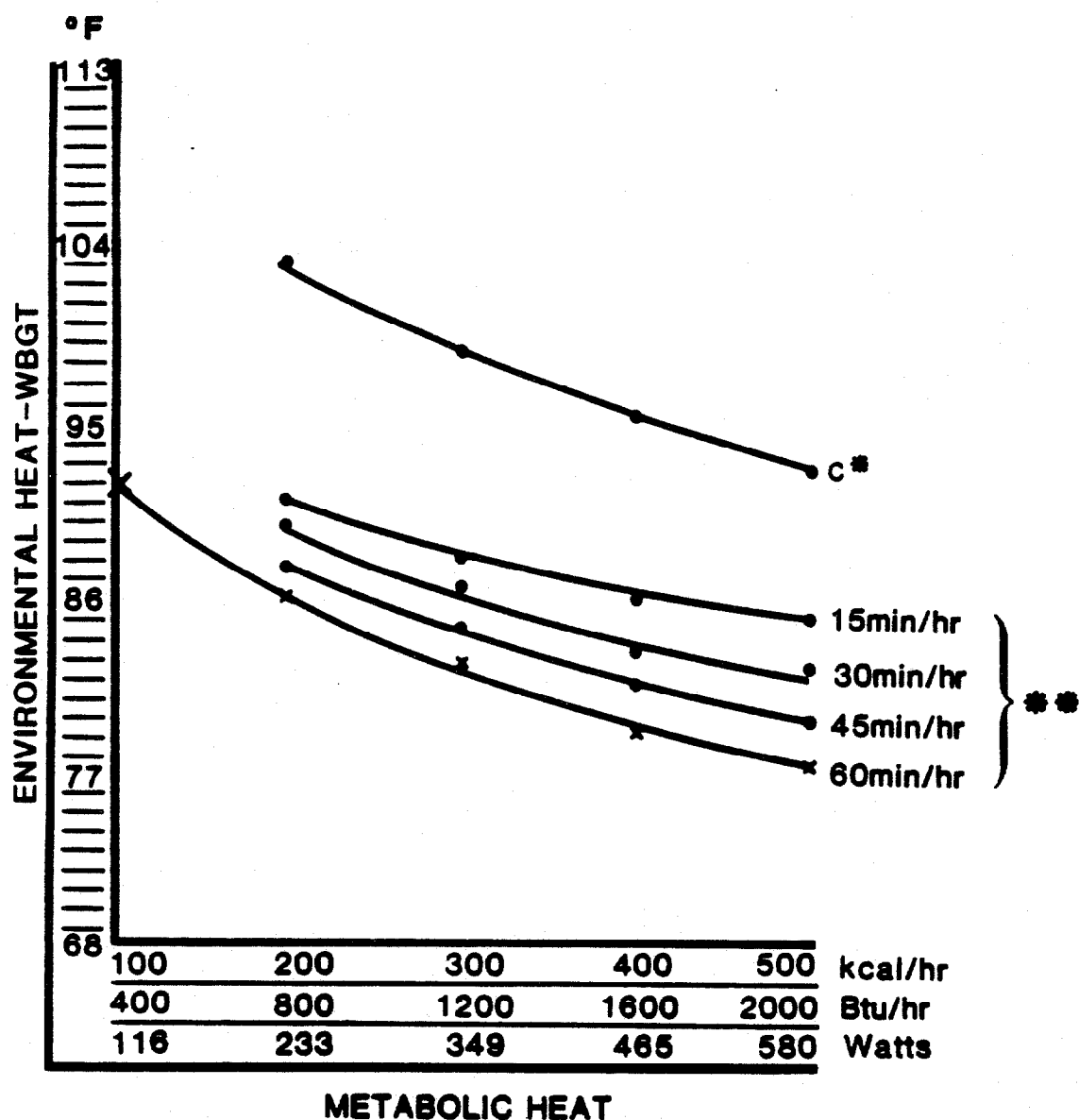
APPENDIX D
RECOMMENDED HEAT STRESS GUIDELINES
FOR UNACCLIMATED/ACCLIMATED WORKERS
IN HOT ENVIRONMENTS



Recommended Heat Stress Guidelines for Unacclimated Workers in Hot Environments

* C= Ceiling Limit - No work should be performed without body cooling provided.

** Work-Rest Regimen - Minutes worked per hour



Recommended Heat Stress Guidelines for Acclimated Workers in Hot Environments

* C= Ceiling Limit - No work should be performed without body cooling provided

** Work-Rest Regimen = Minutes worked per hour

EMPLOYEE PHYSIOLOGICAL MONITORING RECORD FOR HEAT STRESS

Employee Name _____ Date _____ Employee SS# _____
Division _____ Start Time _____ Location _____
P.C.# _____ Stop Time _____ Job Number _____
Health & Safety Coordinator _____ Supervisor _____

TEMPERATURES

A. INITIAL READING

1. Ambient Air Temperature _____
2. Baseline Oral Temperature _____
3. WBGT _____

B. AFTER FIRST WORK PERIOD

1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

C. AFTER SECOND WORK PERIOD

1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

D. AFTER THIRD WORK PERIOD

1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

E. AFTER FOURTH WORK PERIOD

1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

F. AFTER FIFTH WORK PERIOD

1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

HEART RATE

A. INITIAL READING

1. Baseline Heart Rate _____ B/min

B. AFTER FIRST WORK PERIOD

1. Heart Rate _____ B/min

C. AFTER SECOND WORK PERIOD

1. Heart Rate _____ B/min

D. AFTER THIRD WORK PERIOD

1. Heart Rate _____ B/min

E. AFTER FOURTH WORK PERIOD

1. Heart Rate _____ B/min

F. AFTER FIFTH WORK PERIOD

1. Heart Rate _____ B/min

APPENDIX E
NIOSH/OSHA/USCG/EPA GUIDANCE FOR DRUM HANDLING

Drums that May Contain Explosive or Shock-Sensitive Waste

- If a drum is suspected to contain explosive or shock-sensitive waste as determined by visual inspection, seek specialized assistance before any handling.
- If handling is necessary, handle these drums with *extreme caution*.
- Prior to handling these drums, make sure all non-essential personnel have moved a safe distance away.
- Use a grappler unit constructed for explosive containment for initial handling of such drums.
- Palletize the drums prior to transport. Secure drums to pallets.
- Use an audible siren signal system, similar to that employed in conventional blasting operations, to signal the commencement and completion of explosive waste handling activities.
- Maintain continuous communication with the Site Safety Officer and/or the command post until drum handling operations are complete.

Drums Containing Radioactive Waste

- If the drum exhibits radiation levels above background, immediately contact a health physicist. Do *not* handle any drums that are determined to be radioactive until persons with expertise in this area have been consulted.

**APPENDIX F
IT PROCEDURE HS 512
HANDLING OF BLOOD
OR OTHER POTENTIALLY INFECTIOUS MATERIAL**



Approved by *[Signature]*

PROCEDURE

(subject) **HANDLING OF BLOOD OR OTHER POTENTIALLY INFECTIOUS MATERIAL**

1.0 PURPOSE AND SUMMARY

The potential for accidental transmission of infectious agents to persons handling infectious materials in the workplace, has prompted various governmental agencies to adopt recommended work practices and regulations to govern this area. IT encounters potentially infectious agents in various types of work, including:

- Packaging, handling, and disposal of biological wastes at clandestine and legal laboratory operations;
- Work in areas with exposed human or animal excrement, or where materials contaminated with body fluids are found; and
- Emergency response operations involving infectious wastes or other potentially infectious materials.

Exposure control programs must address at least the following:

- Exposure determination,
- Exposure control plan,
- Medical surveillance and prophylactic measures,
- Personal protective equipment,
- Training,
- Work practices, and
- Accidental exposure follow-up

2.0 TABLE OF CONTENTS

1.0	Purpose and Summary
2.0	Table of Contents
3.0	Responsibility Matrix
3.1	Procedure Responsibility
3.2	Action/Approval Responsibilities
4.0	Definitions
5.0	Text
5.1	Exposure Control Plan
5.2	Methods of Compliance
5.2.1	General
5.2.2	Engineering and Work Practice Controls
5.2.3	Housekeeping
5.2.4	Personal Protective Equipment
5.2.5	Infectious Waste Disposal
5.2.6	Laundry
5.2.7	Communication of Hazards
5.2.8	Training



- 5.2.9 Training Records
- 5.2.10 Medical Requirements
- 5.3 First Aid/CPR Trained Personnel
- 6.0 Exception Provisions
- 7.0 Cross Reference
- 8.0 Attachments

3.0 RESPONSIBILITY MATRIX

- 3.1 **Procedure Responsibility.** The Corporate Director, Health and Safety is responsible for the issuance, revision, and maintenance of this procedure.
- 3.2 **Action/Approval Responsibilities.** The Responsibility Matrix is Attachment 1 in Section 8.0.

4.0 DEFINITIONS

- 4.1 **"Blood"** means human blood, human blood components and products made from human blood.
- 4.2 **"Bloodborne Pathogens"** means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).
- 4.3 **"Disinfect"** means to inactivate all recognized pathogenic microorganisms but not necessarily all microbial forms (e.g. bacterial endospores) on inanimate objects.
- 4.4 **"Exposure Incident"** means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.
- 4.5 **"Infectious Waste"** means blood and blood products, contaminated sharps, pathological wastes and microbiological wastes.
- 4.6 **"Occupational Exposure"** means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties. This definition excludes incidental exposures that may take place on the job, and that are neither reasonably nor routinely expected and that the worker is not required to incur in the normal course of employment.
- 4.7 **"Other Potentially Infectious Materials"** means (1) The following body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, and any body fluid that is visibly contaminated with blood. (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead). (3) HIV- or HBV-containing cell or tissue cultures, organ cultures, and culture medium or other solutions; and blood, organs or other tissues from experimental animals infected with HIV or HBV. (4) Any experimental animal tissue or cultures.



- 4.8 "Parenteral" means exposure occurring as a result of piercing the skin barrier (e.g. subcutaneous, intramuscular, intravenous routes).
- 4.9 "Patient" means any individual, living or dead, whose blood, body fluids, tissues, or organs may be a source of exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the mentally impaired or mentally disabled; trauma victims, clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains prior to embalming; and individuals who donate or sell blood or blood components.
- 4.10 "Personal Protective Equipment" is specialized clothing or equipment worn by an employee to protect him/her from a hazard.
- 4.11 "Sharps" means any object that can penetrate the skin including, but not limited to, needles, scalpels, and broken capillary tubes.
- 4.12 "Sterilize" means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.
- 4.13 "Universal Precautions" is a method of infection control in which all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.
- 4.14 "Work Practice Controls" means controls that reduce the likelihood of exposure by altering the manner in which a task is performed.

5.0 TEXT

5.1 Exposure Control Plan

Each project, including emergency response, involving potential for occupational exposure shall have, as part of the site-specific health and safety plan, a written exposure control plan designed to minimize or eliminate employee exposure. This plan shall be prepared prior to the commencement of work, and shall contain as a minimum:

5.1.1 Exposure Determination.

Each task or procedure where occupational exposure may take place must be identified and documented. Such determination of potential exposure shall be made without regard to the use of personal protective equipment.

5.1.2 Schedule of Implementation.

The schedule and method of implementation of the Exposure Control Plan must be specified.

5.1.3 Exposure Evaluation.

Each plan shall reflect the requirements in 29CFR1910.1030(c)(2) and (f)(3), covering evaluations of an exposure incident.



5.1.4 Review and Update.

Provision must be made for the review and update of the Exposure Control Plan.

5.1.5 Protective Measures.

Work practices and personal protective equipment shall be specified for each task or procedure where an occupational exposure may occur.

5.2 Methods of Compliance

5.2.1 General.

Universal Precautions as described below shall be observed to prevent contact with blood and other potentially infectious materials.

Universal Precautions

- All workers shall routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids is anticipated. Gloves should be worn for touching blood and body fluids, mucous membranes, or non-intact skin for handling items or surfaces soiled with blood or body fluids. Masks (as selected and approved by health and safety) and protective eye wear or face shields shall be worn during procedures that are likely to generate droplets of blood or other body fluids to prevent exposure of mucous membranes of the mouth, nose, and eyes. Protective suits shall be worn during procedures that are likely to generate splashes of blood or other body fluids.
- Hands and other skin surfaces shall be washed immediately and thoroughly if contaminated with blood or other body fluids. Hands shall be washed immediately after gloves are removed, using a disinfectant soap.
- All workers shall take precautions to prevent injuries caused by needles, scalpels, and other sharp instruments or devices during handling. To prevent needlestick injuries, needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. Disposable syringes and needles, scalpels, blades, and other sharp items shall be placed in puncture-resistant containers for disposal.
- Mouthpieces, resuscitation bags, or other ventilation devices should be available for use in areas in which the need for resuscitation is predictable.
- Workers who have exudative lesions or weeping dermatitis shall be excluded from handling potentially infectious materials until the condition resolves.
- Pregnant workers should be especially familiar with and strictly adhere to precautions to minimize the risk of transmission.



5.2.2 Engineering and Work Practice Controls.

Universal precautions shall be supplemented by the following work practice controls.

- All personal protective equipment shall be removed immediately upon leaving the work area, or as soon as possible if overtly contaminated, placed in an appropriately designed area or container for storage, decontamination or disposal.
- Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a potential for occupational exposure.
- Food and drink shall not be stored in refrigerators, freezers, or cabinets where blood or other potentially infectious materials are stored or in other areas of possible contamination.
- All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, and aerosolization of these substances.
- Mouth pipetting is prohibited.

5.2.3 Housekeeping.

- A written schedule of routine cleaning and disinfection shall be established, as appropriate, for each facility or operation.
- Work surfaces shall be decontaminated immediately after any spill of potentially infectious materials, and at the end of the work shift. An effective disinfection solution can be prepared by diluting household chlorine bleach with water to make a 10% bleach solution (1 part bleach + 9 parts water).
- Reusable items contaminated with potentially infectious materials shall be decontaminated prior to washing and/or reuse.
- All bins, pails, cans, and similar receptacles intended for reuse which have a potential for becoming contaminated with blood or other potentially infectious materials shall be inspected, cleaned, and disinfected on a regularly scheduled basis and cleaned and disinfected immediately or as soon as possible upon visible contamination.
- Broken glassware which may be contaminated shall not be picked up directly with the hands. It shall be cleaned up using mechanical means.

5.2.4 Personal Protective Equipment.

- Protection for the eyes, face, hands, body, feet, and against inhalation hazards shall be provided as appropriate for each job.
- Gloves. Glove shall be worn when employee has the potential for the hands to have direct skin contact with blood, other potentially infectious materials, mucous membranes, non-intact skin, and when handling items or surfaces soiled with blood or other potentially infectious materials.
- Disposable (single use) gloves, such as surgical or examination gloves, shall be replaced when visibly soiled, torn, punctured, or when their ability to function as a barrier is compromised. They shall not be washed or disinfected for re-use.
- Utility gloves may be disinfected for re-use if the integrity of the glove is not compromised; however, they must be discarded if they are cracked, peeling, discolored, torn, punctured, or exhibit other signs of deterioration.
- Masks, Eye Protection, and Face Shields. Masks and eye protection or chin-length face shields shall be worn whenever splashes, spray, splatter, droplets, or aerosols of blood or other potentially infectious materials may be generated and there is a potential for eye, nose, or mouth contamination.
- Fluid-resistant clothing (e.g. coated Tyvek suits) shall be worn if there is a potential for splashing or spraying of blood or potentially infectious materials.
- Surgical caps or hoods shall be worn if there is a potential for splashing or splattering of blood or potentially infectious materials on the head.
- Fluid-proof clothing (e.g. coated Tyvek suits) shall be worn if there is a potential for clothing becoming soaked with blood or other potentially infectious materials.
- Fluid-proof shoe covering shall be worn if there is a potential for shoes to become contaminated and/or soaked with blood or other potentially infectious materials.
- Emergency Response. During emergency operations involving potentially infectious materials 29CFR1910.120 is controlling. This regulation requires the use of NIOSH approved respirators for aerosol protection, not "masks".

5.2.5 Infectious Waste Disposal.

- All infectious waste destined for disposal shall be placed in closable, leakproof containers or bags that are color coded or labeled as required by paragraph 5.2.7 of this procedure.



If outside contamination of the container or bag is likely to occur then a second leakproof container or bag which is closable and labeled or color-coded as described in paragraph 5.2.7 shall be placed over the outside of the first and closed to prevent leakage during handling, storage, and transport.

Disposal of all infectious waste shall be in accordance with applicable Federal, State and local regulations.

- Sharps shall be disposed of in closable, puncture resistant, disposable containers which are leakproof on the sides and bottom and that are labeled or color-coded according to paragraph 5.2.7.

These containers shall be easily accessible to personnel and located in the immediate area of use.

These containers shall be replaced and not allowed to overfill.

5.2.6 Laundry.

- Laundry from workplaces with employees covered under this policy that is contaminated with blood or other potentially infectious materials or may contain contaminated sharps shall be treated as if it were contaminated and shall be handled as little as possible and with minimum of agitation.

Contaminated laundry shall be bagged at the location where it is used and shall not be sorted or rinsed.

Contaminated laundry shall be placed and transported in bags that are labeled or color-coded as described in paragraph 5.2.7. Whenever this laundry is wet and presents the potential for soak-through or leakage from the bag, it shall be placed and transported in leakproof bags.

5.2.7 Communication of Hazards.

5.2.7.1 Signs and Labels.

- All work areas where potentially infectious agents are present shall be posted with signs bearing the following legend:

BIOHAZARD



[Name of the Infectious Agent]
[Special requirements for entering area]
[Name, telephone number of the laboratory
director or other responsible person]



- Labels. Warning labels shall be affixed to containers of infectious waste; refrigerators and freezers containing blood and other potentially infectious materials; and other containers used to store or transport blood or other potentially infectious materials.

Labels shall include the following legend:

BIOHAZARD



These labels shall be fluorescent orange or orange-red or predominantly so, with lettering or symbols in a contrasting color.

Labels shall either be an integral part of the container or shall be affixed as close as safely possible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

- Red bags or red containers may be substituted for labels on containers of infectious waste.

5.2.8 Training.

All employees assigned to jobs with occupational exposure to potentially infectious materials shall receive specialized training prior to commencement of work and at least annually thereafter, covering the following elements:

- A copy of 29CFR1910.1030 and this procedure including an explanation of the contents;
- A general explanation of the epidemiology and symptoms of bloodborne diseases;
- An explanation of the modes of transmission of bloodborne pathogens;
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials;
- An explanation of the use and limitations of practices that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment;
- Information of the types, proper use, location, removal, handling, decontamination and/or disposal of personal protective equipment;



- An explanation of the basis for selection of personal protective equipment;
- Information on the hepatitis B vaccine, including information on its efficacy, safety, and the benefits of being vaccinated;
- Information on the appropriate actions to take and persons to contact in an emergency;
- An explanation of the procedure to follow if an exposure incident occurs including the method of reporting the incident and the medical follow-up that will be made available. Also information on the medical counseling that is provided for exposed individuals; and
- An explanation of required signs and labels.

5.2.9 Training Records.

Training records shall include the following information and be maintained for five (5) years:

- The date of the training sessions;
- The contents or a summary of the training sessions;
- The names of persons conducting the training; and
- The names of all persons attending the training sessions.

5.2.10 Medical Requirements.

5.2.10.1 All employees will receive medical evaluations in accordance with ITC Procedure HS100, and records will be maintained per IT Procedure HS102.

5.2.10.2 All employees with occupational exposure shall receive the hepatitis B vaccination (HBV) and tetanus vaccination prior to workplace exposure, unless they read and sign the Hepatitis B and Tetanus Vaccination Declination Form (Attachment 3).

- Hepatitis B Vaccination. Recombivax or Accelerated Recombivax vaccines shall be utilized. If the employee has received the HBV previously and/or antibody testing reveals that the employee is immune, a new vaccination is not required.

Employees may be subjected to occupational exposure after receiving the first shot in the HBV series. Antibody testing shall be performed 30 days after completing the HBV series. Employees unable to develop immunity shall be precluded from further occupational exposure.



Should a booster dose(s) be recommended by a physician, they shall be provided according to standard recommendations for medical practice.

- Tetanus Vaccination. Current status for tetanus vaccination is within 5 years. Documentation of current status shall be maintained for all employees subject to this policy.
- Post-exposure evaluation and follow-up. All exposure incidents shall be reported as an industrial injury. The Corporate Medical Director shall be advised immediately via the Corporate H&S office. Following a report of an exposure incident, the employer shall make available to each employee a confidential medical evaluation and follow-up including at least the following elements:
 - Documentation of the route(s) of exposure, HBV and HIV antibody status of the source patient(s) (if known), and how the exposure occurred. The medical confidentiality rights of the source patient shall be preserved at all times.
 - If the source patient can be determined and permission is obtained, collection of and testing of the source patient's blood to determine the presence of HIV or HBV infection shall be conducted under the direction of the attending physician.
 - Collection of blood from the exposed employee as soon as possible after the exposure incident for the determination of HIV and/or HBV status. Actual core antibody and surface antigen testing of the blood or serum sample may be done at that time or at a later date if the employee so requests. If the test is deferred, arrangements shall be made through the attending physician to properly archive the specimen.
 - Follow-up of the exposed employee including antibody and antigen testing, counseling, illness reporting, and safe and effective post-exposure prophylaxis, according to standard recommendations for medical practice as defined by the Corporate Medical Director.

5.2.10.3

Information provided to the physician. The employer shall provide the following information to the evaluating physician:

- A copy of 29CFR1910.1030 and its appendices, and



- A description of the affected employee's duties as they relate to the employee's occupational exposure.

5.2.10.4

Physician's written opinion. For each evaluation, obtain and provide the employee with a copy of the evaluating physician's written opinion within 15 working days of the completion of the evaluation. The written opinion shall be limited to the following information:

- The physician's recommended limitations upon the employee's ability to receive hepatitis B vaccination.
- A statement that the employee has been informed of the results of the medical evaluation and that the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.
- Specific findings or diagnoses, which are related to the employee's ability to receive HBV vaccination. Any other findings and diagnoses shall remain confidential.

5.3

First Aid/CPR Trained Personnel. This procedure is applicable to personnel designated as first aid/CPR providers when it is determined that the facility or project location cannot comply with the requirement to be in "close proximity" to professional medical aid under 29CFR1910.151. (NOTE: This requirement is generally met if a "911" paramedic response system or equivalent serves the area.)

Except where IT is required to provide designated first aid/CPR providers under 29CFR1910.151, it is our policy to train a broad base of employees who render emergency assistance on a voluntary basis. Where designated responders are required, a minimum of two persons per shift shall be qualified in accordance with this procedure. Small locations or projects may reduce this number to one per shift with the prior approval of the regional or divisional HS Manager.

When voluntary or non-designated first aid/CPR providers are used, the special provisions listed below shall be followed.

- The Exposure Control Plan shall provide for offering the hepatitis B vaccination, within twenty-four hours, to any unvaccinated first aid/CPR provider rendering aid in an incident involving the presence of blood or other potentially infectious materials.
- A Supervisor's Employee Injury Report (SEIR) shall be completed for all first aid/CPR providers involved in an incident with blood or other potentially infectious materials. The manager or HS professional MUST specifically indicate whether an "exposure incident" as defined in section 4.4 of this procedure took place, and what protective equipment was used.



- Each location shall maintain a list of all such first aid incidents as an attachment to their OSHA Log of Occupational Injuries and Illnesses. The log and first aid incident list (or copies) shall be forwarded to the corporate HS office on February 1 of the following year.
- All associates who are first aid/CPR trained and may provide assistance, shall be trained in these requirements for voluntary providers and the general provisions of this procedure.

6.0 EXCEPTION PROVISIONS

All exceptions to established policy shall follow the provisions of ITC Procedure HS013: Health and Safety Procedure Variance.

7.0 CROSS REFERENCES

HS101 Management of Employee Exposure & Medical Records
HS102 Drug & Alcohol Testing

8.0 ATTACHMENTS

Attachment 1: Responsibility Matrix
Attachment 2: Personal Protection Equipment Matrix
Attachment 3: Hepatitis B Vaccination Declination Form

International Technology Corporation

Handling of Blood or Other Potentially Infectious Materials

Responsibility Matrix

Attachment 1

Action	Responsible Party			
	Section	Manager	HS	Employees
Develop and Implement Exposure Control Plans	5.1	X	X	X
Require Use of Work Practices and Other Controls	5.2-5.6	X		
Use Proper Work Practices and Controls, as described	5.2-5.6,5.8,5.10			X
Post Areas	5.7	X		
Provide and Attend Training	5.8	X	X	X
Maintain Training and Medical Records	5.9-5.10		X	
Coordinate Medical Requirements	5.10		X	

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 Revision No. 4
 Date 06/14/93
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ATTACHMENT 2

Biowaste PPE Matrix

	<u>Minimal¹ Exposure Potential</u>	<u>Slight² Exposure Potential</u>	<u>Moderate³ Exposure Potential</u>
Respirator Protection	None	Surgical mask or half mask with HEPA filters	Full facepiece APR with HEPA filters
Eye Protection	Glasses or safety glasses	Goggles	N/A
Face Protection	None	Face shield	N/A
Head Protection	Hardhat	Hardhat	Hardhat and fluid resistant hood
Hand Protection	Fluid resistant ⁴ gloves	Cut resistant ⁵ outer glove and fluid resistant inner glove	Cut resistant outer glove and fluid resistant inner glove
Body Protection	Work uniform or coveralls	Work uniform and Tyvek ⁶ coveralls	Work uniform and poly-Tyvek type coveralls
Footwear	PVC or Nitrile boots	PVC or Nitrile boots	PVC or Nitrile boots

1. Minimal Exposure: Handling boxed wastes, no cut or splash potential.
2. Slight Exposure: Handling bagged wastes, slight cut or splash potential.
3. Moderate Exposure: Handling loose wastes, slight cut and moderate to high splash potential.
4. Fluid resistant means able to prevent penetration of undamaged glove by liquids likely to be encountered.
NOTE: Surgical or exam gloves alone do not meet this requirement.
5. Cut resistant means able to resist mechanical damage from accidental contact with sharps and from routing work activities. Leather or heavy canvas gloves will usually be acceptable; specialized gloves (Kevlar, knitted steel, etc.) may be required for specific tasks.
6. Mention of a specific trade name does not require the use of the product; it is intended only for illustrative reasons.



ATTACHMENT 3

Hepatitis B and Tetanus Vaccination Declination

Due to the potential for you to have occupational exposure to potentially infectious materials in your work, the company will provide and encourages you to accept, vaccination for hepatitis B and tetanus. Information to assist you in this decision is provided below.

Tetanus

- A bacterial disease causing muscle spasms, seizures, and "lockjaw".
- This single injection vaccination has few side effects.
- There is minimal loss in protection if the vaccination is given at the time of an exposure/injury rather than in advance.

Hepatitis B

- A viral infection of the liver.
- About 9,500 occupational cases occur each year, mostly in health care workers, with about 200 deaths.
- This three injection vaccination has few side effects.
- Vaccination is 90% effective for at least seven years when given prior to exposure.
- Vaccination is 70-88% effective when given within one week of exposure.
- Hepatitis B can survive in the environment for 24-48 hours after drying.
- Risk of infection from one cut or puncture wound from a contaminated object:
 - hepatitis B virus 6-30%
 - human immunodeficiency virus (AIDS) 0.5%

If you wish to talk to a company doctor before making your decision, please ask the health and safety department to make arrangements for you. If you choose to decline vaccination at this time, you must print and sign your name, and date the bottom of this form.

David Barnes, M.D.

Kurt Krueger, Director/H&S

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection.

I have been given the opportunity to be vaccinated by hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease.

If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive this vaccination series at no charge to me.

Name Printed _____

Signature _____

Date _____

HS512A (6/14/93)

APPENDIX G
CONTROL OF HAZARDOUS ENERGY

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1.0 Purpose/Scope

This Standard Operating Procedure (SOP) establishes minimum requirements for the lockout and tagout of energy isolating devices. It establishes measures to ensure the safety of employees during the installation, maintenance, and servicing of equipment and/or machinery where the unexpected energizing or the release of stored energy could cause employee injury.

This SOP fulfills the requirements of establishing a safe clearance procedure as specified in Section 28 of the USACE Safety and Health Requirements Manual, EM385-1-1 (Revised October, 1987). It also meets the requirements of controlling hazardous energy (Lockout/Tagout) as specified in Section 12 of the USACE Safety and Health Requirements Manual EM385-1-1 (Revised October, 1992) and 29 CFR 1910.147.

2.0 Hazards Identified

Hazards identified are employee injury or damage to property caused by the unexpected energizing, start-up, or release of stored energy during installation, maintenance, and servicing of equipment and/or machinery.

3.0 Hazard Control Measures

This SOP will prevent injury and property damage caused by unexpected energizing, start-up, or release or stored energy.

4.0 Equipment Required

- Chains
- Blanks or Blinds
- Lockout Devices
- Lockout/Tagout Forms
- Lockout/Tagout Log
- Multiple Locking Devices
- Nylon Cable Ties
- Electrical Testing Devices.

5.0 References

- USACE Safety and Health Requirements Manual, 385-1-1 (Revised October, 1987)
- USACE Safety and Health Requirements Manual, 385-1-1 (Revised October, 1992)

- 29CFR 1926.417, Lockout and Tagging of Circuits
- 29CFR 1910.147, Control of Hazardous Energy (Lockout/Tagout).

6.0 Responsibilities

6.1 Project Superintendent

The Project Superintendent or his designee is responsible for reviewing the planned activities prior to commencement of work and confirming that all authorized and affected employees are made aware of when the work will commence. He/she will initiate the lockout/tagout order and review with the authorized employees the steps to be followed on the lockout/tagout order.

He/she is responsible for verifying that all proper lockout procedures have been followed, including disconnect operations, appropriate attachment of locks and tags, and proper documentation of these lockout procedures. He/she is also the designated custodian and controller of all keys and locks issued to all lockout/tagout orders.

He/she is responsible for ensuring that all power disconnect operations, attachment of blinds, chains, locks and tags follow the requirements of this SOP and for proper documentation of these activities.

The Project Superintendent is responsible for the thorough inspection of equipment prior to the removal of an employee's lockout device by someone other than that employee to ensure that the conditions are safe to remove the lockout device.

6.2 Site Safety and Health Officer

The Site Safety and Health Officer is responsible for verification that all proper site safety precautions and this lockout/tagout SOP are being followed, and for compliance with federal, state, and local policies. The Site Safety and Health Officer is responsible for monitoring field activities to ensure compliance with this SOP. He/she is also responsible for periodic audits of the SOP.

7.0 Definitions

Affected Employee. Any employee whose job requires him/her to operate or use a machine or equipment on which installation, servicing or maintenance is being done under lockout/tagout procedures or whose job requires him to work in an area in which such servicing or maintenance is being performed. These employees would also include those who arrive to perform servicing or maintenance after the initial lockout has been completed.

Authorized Employee. An employee who by an initial training program is authorized to identify the energy isolating devices and implement a lockout/tagout order for the purpose of the placement of lockout devices, locks and tags to insure the safety of all personnel required to install, service or maintain equipment and/or machinery.

NOTE: An authorized and affected employee can be the same person when the affected employee's duties also include maintenance or servicing the machine or equipment to be locked out.

Energy Isolation Device. A mechanical device that physically prevents the transmission or release of stored energy, power, pressure, or flow including, but not limited to, the following: electrical disconnect switches, circuit breakers, block valves, slip blinds, and any similar device used to block or isolate energy.

Energy Source. Any electrical, mechanical, hydraulic, pneumatic, chemical, thermal, pressurized vessel or piping, or any other potential energy source.

Lockout Device. A device that utilizes a positive means, such as but not limited to a lock, to hold the energy isolating device in a safe position and prevent the unexpected energization of the equipment and/or machinery.

Tagout Device. A prominent warning device such as a tag and a means of attachment, which can be securely fastened to an energy isolating device to indicate that the device and the equipment being controlled cannot be operated until the tagout device is removed.

The lockout/tagout procedure is controlled by the following forms:

Form #11.1 Lockout/Tagout Request

- Filled out by the authorized employee and submitted to the Project Superintendent or designee.

Form #11.2 Lockout/Tagout Log

- Maintained by the Project Superintendent

Form #11.3 Lockout/Tagout Order

- Filled out by an authorized employee and submitted to the Project Superintendent and Site Safety and Health Officer for approval to execute.

Form #11.4 Tags

- Tags will be issued from the Project Superintendent's Office (returned to same after removal).

8.0 Safety

8.1 Audit

A periodic audit will be performed of this SOP to ensure its requirements are being followed. The audit shall be conducted by personnel other than the employees utilizing the lockout procedure. If deficiencies are observed, they will be corrected at the time of the audit.

A follow-up audit will be conducted to ensure deficiencies have been corrected. The Site Safety and Health Officer will ensure that the audit is performed on a regular basis.

8.2 Documentation

During audits of this SOP, review of the employee responsibilities and understanding of the SOP shall be conducted. The audit will consist of: Date of audit, identification of the machine or equipment on which the lockout procedure is being utilized, employees interviewed, and person(s) performing the inspection.

8.3 Training

The Site Safety and Health Officer will provide training to ensure that all employees understand this SOP, and that affected and authorized employees are qualified to implement the procedure.

8.3.1 Hazardous Energy Source

All authorized employees will receive training in recognition of hazardous energy sources and the means necessary for energy isolation and control.

8.3.2 Purpose of Procedures

All affected employees will be trained and instructed in the purpose and use of this SOP.

8.3.3 Subcontractor Training

All subcontractors will be instructed in the contents of this SOP. Training will emphasize the prohibition of attempting to re-energize locked out equipment and the unauthorized removal of lockout or tagout devices.

8.3.4 Retraining

Retraining will be conducted whenever there is a change in job assignments, changes in equipment or machinery that presents a hazard, or when there is a change in the SOP. Retraining will also be conducted whenever there is evidence of the employee deviation, or lack of understanding of the SOP.

8.3.5 Documentation of Training

Documentation of employee training and retraining will be maintained and kept up to date by the Site Safety and Health Officer.

8.4 Application/Removal of Operations Lock and Tag

The lock and tag of the Project Superintendent will be applied first and removed last. Employees responsible for operation of the equipment and personnel working on the equipment are the only persons authorized to request installation and removal of the Project Engineer's locks and tags.

8.5 Locks

Locks are to be used when a machine or equipment is capable of being locked out. All locks will be accompanied by a tag to indicate the name of the employee applying the lockout device and warn against the hazard. All tags and their means of attachment will be sturdy enough to prevent inadvertent removal. The tag attachment means will be of the non-reusable type, attachable by hand, self-locking, and non-releasable, with a minimum unlocking strength of not less than 50 pounds (e.g., nylon cable ties). Tags must be durable and not deteriorate from exposure to weather conditions and corrosive environments or cause the message on the tag (hand written or pre-existing) to become illegible.

The multiple locking device will be used with authorized employees placing their assigned locks and tags on this device, along with the Project Superintendent's lock. Where only one lock position remains on the multiple device, a second lockout device will be attached at that position.

8.6 Tags

All tags will contain the authorized employee's name, date of application of lock, equipment name or number, and the reason for lockout. The tag will be attached to the lock.

8.7 Power-Driven Equipment

All power-driven equipment must be equipped with a locking device as a means of securing it against operation during repairs or when determined unsafe to operate. Whenever new machines or equipment are installed, such equipment must be designed to accept such a lockout device.

8.8 Lockout Methods

Acceptable methods for lockout of air, steam, or hydraulic energy sources include:

- Locking supply valve (i.e., chaining through valve handle with lock) closed with bleeder open on the load side.
- A tagged blank in the supply line.
- Disconnecting and tagging the supply line.

8.9 Automatically Started Equipment

On any equipment that can start automatically, the local control station shall be switched to the "off" position, locked and tagged by the Project Superintendent. This switch must be turned off before opening the disconnect and remain off until the disconnect is closed.

8.10 220-Volt, 480-Volt, 2,300-Volt and 13,200-Volt Equipment

Locking out 220V, 480V, 2,300V and 13,200V equipment will always be done at the main feed or starter panel. Physical disconnection is always the best approach to safety. This shall only be done by qualified electrical personnel.

8.11 Alternate Method of Lockout

If it is impossible or impractical to lockout a piece of equipment, the Site Safety and Health Officer and the Project Superintendent must approve a method to make the equipment safe before any activities beyond normal operation of the equipment are performed. This can be done by disconnecting wiring, removing fuses, disconnecting or blanking supply lines, etc. **"DANGER - Do Not Operate"** tags must be used to describe the condition. Any electrical alteration required to make equipment or machinery safe to work on shall be performed by qualified personnel.

8.12 Prohibited Lockout Practice

The practice of someone else placing a lock for an employee is not permitted. No person can be sure he/she is safe until he/she places his/her own lock correctly.

8.13 Disciplinary Action

Violation of any of the provisions of this SOP shall result in disciplinary action up to and including termination of employment.

9.0 Normal Operating Procedure

When it has been determined that an energy isolating device must be locked out and tagged out, a Lockout/Tagout Request Form (Figure 11.1) must be initiated. When the request has been approved by the Project Superintendent or his designee, he/she shall prepare the Lockout/Tagout Order, (Figure 11.2) and enter the appropriate information in the Lockout/Tagout Log (Figure 11.3). A Job Hazard Analysis (Figure 11.4) shall be prepared by the Project Superintendent and/or the Site Safety and Health Officer and the Supervisor.

9.1 Authorized Employees Performing Installation, Servicing or Maintenance

Before any machine or equipment is taken out of service, the employees performing the lockout/tagout shall be given a tailgate safety meeting by their supervisor. This safety meeting shall review the Job Hazard Analysis, and shall cover the type and magnitude of the energy source involved, hazards of the energy to be controlled, and the method or means to control the energy.

9.2 Process and Utility Lines

The "chain and lock" method will be used to isolate process and utility lines and all process piping to and from equipment or tanks. Where equipment with multiple valve locations exists, the Project Superintendent may be called upon to determine if a blind list is required for the job.

Blinding may be required on process lines that will be left open overnight or where the safety of the system is questionable. This is at the discretion of the Project Superintendent. Tags will be applied to each blind indicating the hazard present, and to indicate not to remove the blind. There may be conditions where blinding would be required, such as leaking valves, or where the equipment will be out of service for long periods of time.

The Project Superintendent or his designee will do the following:

- Assure that the equipment is properly safe (purged or flushed).
- Chain and lock the isolating system including remote valves using a lockout device such that the valves cannot be opened. This may require several locks, lockout devices and chains.
- Attach a tag at the lockout device that contains the equipment number, date, work to be performed, special handling or safety precautions (i.e., caustic, acid, etc.), and signature.
- Go with the authorized employee and together inspect the isolated system and discuss the job to be done.
- "Try" isolation by attempting to open all valves and by opening bleeder(s). Use drip pan and spill absorbent pads.
- Inspect job site for cleanliness/order and concur with craftsman on job completion. Remove lock and tag.

- Ensure completion of job and status of equipment and write in the lockout/tagout log.

The authorized employee will do the following:

- Inspect the isolated system with the Project Superintendent. Discuss job to be done and "try" the isolated system to assure equipment is safe.
- The authorized employee working on the system will attach his/her assigned lock and tag to the lockout device. Affected employees will be notified of the locking device.
- Upon job completion, the last authorized employee involved will remove his/her lock and tag and inform the Project Superintendent of the job status.

9.3 Air-Operated Block Valves (AMV)

The manual operator (hand wheel) shall be chained, locked and tagged. The air supply valve must be closed, chained, locked, tagged, and air bled from supply line. All steps contained in Sections 9.1 and 9.2 above also apply to locking out air-operated block valves.

9.4 Electrically Operated Block Valves (EMV)

EMVs must be identified, de-energized, locked, and tagged as outlined in Sections 9.1 and 9.2 above. The manual operator (hand wheel) must also be chained and locked.

If a lockout device cannot be installed on the electrical supply breaker, then the electrical supply to the block valve must be disconnected and tagged out so electric current cannot possibly flow to the block valve operator. This shall be performed by qualified electrical personnel.

9.5 Removal of Lockout and Tagout Devices

Each assigned lock or tag will be removed only by the employee who applied it.

Removal of locks and/or tags by other than those employees who applied the device(s) will only be permitted as follows:

- The Project Superintendent has verified that the employee who applied the lock/tag is not on site.

- All reasonable efforts have been made to contact and inform the employee that his/her lock and/or tag is being removed.
- Ensure that the employee whose lock and/or tag was removed has this knowledge before he/she resumes work on site.
- Written approval will be required on the Lockout/Tagout Request Form by the Project Superintendent and the Site Safety and Health Officer, after their thorough inspection of the equipment shows that conditions are safe to remove the lock and/or tag.
- The removed lock and/or tag, along with the written authorization to remove the device, will be sent to the appropriate supervisor in charge of the employee for review and any action necessary.

9.6 Shift or Personnel Changes

If the job is going to be carried over into later shifts, the outgoing authorized employees will remove their assigned locks and tags and the oncoming authorized employees will place their assigned locks and tags.

9.7 Troubleshooting

Special precautions must be observed when authorized and qualified craftsmen must perform maintenance troubleshooting tasks with energized equipment. This function requires added caution and communications between craftsmen and all other affected employees to ensure employee protection.

Operating personnel will identify all start-stop locations and circuit breakers disconnecting equipment for craftsmen. All affected employees must be kept informed and work with the craftsmen throughout the testing and troubleshooting. If the job is to be left incomplete, the craftsmen shall notify his/her supervisor to initiate the Lockout/Tagout Request.

The following sequence of actions must be followed:

- A written Job Hazard Analysis will be approved by the Project Superintendent and Site Safety and Health Officer after their thorough inspection of the equipment shows that the troubleshooting can be performed under safe conditions.
- Inspect and clear the machine or equipment of all tools and unnecessary materials.

- Safely position all employees out of the way from machine activation. Instruct employees in the procedure that will be followed, the potential hazards that exist, and the safety precautions that have been taken to ensure their safety per the Job Hazard Analysis.
- Remove the lockout and/or tagout device(s), if applicable.
- Energize and proceed with the troubleshooting, testing, or positioning of the machine or equipment.
- De-energize, reapply all lockout and tagout devices as before the troubleshooting, and "try" the system to ensure de-energization.

9.8 Exempted/Excluded Applications

- When work on electrical equipment which utilizes 120V/240V AC or lesser voltage attached by cord and plug, where the unplugging of the equipment isolates the machine from the energy source, the plug shall be tagged to prevent the accidental or inadvertent plugging in of the cord.
- When lighting panels or other power sources cannot be locked out, move switch to the **off** position and test with voltage test meter to assure it to be de-energized. Apply tape to the breaker/switch to secure in the **off** position and apply a "DO NOT OPERATE" tag to the switch.

9.9 Outside Personnel (Subcontractors, etc.)

All subcontractors will follow this SOP and are required to comply with its provisions. Subcontractor personnel shall receive training on this SOP in the site-specific orientation and through tailgate safety meetings.

10.0 Emergency Operating Procedure _____

See Section 9.5 for the proper steps to follow when locks need to be removed in an emergency situation.

11.0 Attachments _____

- Lockout/Tagout Request
- Lockout/Tagout Order
- Tags
- Lockout/Tagout Logs

PROCEDURE FOR CONTROL OF HAZARDOUS ENERGY
(LOCKOUT/TAGOUT)

September 1, 1993

Revision 0

Approvals: _____
Vice President, CRG

Director of Projects

Director, Health & Safety

Health & Safety Manager

**CONTROL OF HAZARDOUS ENERGY
(LOCKOUT/TAGOUT)**

YORKTOWN

Form 11.1

DATE: ____ / ____ / ____

LOCKOUT/TAGOUT REQUEST

Equipment to be
locked out:

Location:

Reason:

☐ 1. Lock Out/Tag Out

☐ 2. Remove From Service

☐ 3. Place in Service

Requestor:

Date:

Supervisor:

Date:

Site Safety and Health
Officer:

Date:

Project Superintendent:

Date:

NO. _____

[illegible]

FORM 11.3[illegible]

YORKTOWN

FORM 11.4

DATE ____/____/____

JOB HAZARD ANALYSIS

EQUIPMENT NO.:

SCOPE OF WORK:

HAZARDS:

HAZARD CONTROL MEASURES:

LEVEL OF PROTECTION:

COMMENTS:

Site Safety and Health Officer:

Date:

Project Superintendent:

Date:

Supervisor:

Date: